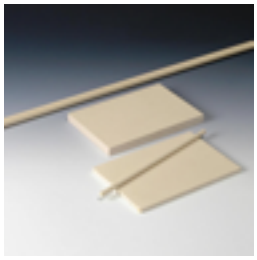
AREMCO
High Temperature Solutions

Since 1965, our success has been a result of this simple business strategy:

- Understanding Customer Requirements.
- Providing Outstanding Service and Support.
- Producing High Quality Technical Materials and Equipment.
- Solving Difficult Technical Problems.

CONTENTS

Aremco's advanced material division is a leader in the development and production of technical ceramics, adhesives, coatings, sealants and potting compounds for applications to 3200 °F. These materials are used throughout industry in the design of sensors, electrical components and analytical instruments. Industries served include automotive, aerospace, chemical processing, metallurgical, power generation and semiconductor.



Aremco offers a broad range of machinable and dense ceramics for applications that require high temperature electrical and thermal insulation, and corrosion, impact and wear resistance.

Aremcolox™ and Super-Heat™ ceramics include compositions based on aluminum oxide, alumino-silicate, aluminum nitride, boron nitride, glass-ceramics, magnesium oxide, and zirconium oxide.

Production capabilities include isostatic and dry pressing, low-pressure injection molding, extrusion, slip casting, and CNC machining.

TYPICAL APPLICATIONS

Aerospace
Gas Nozzles, Thermal Insulators, Space Mirrors, and Nose Cones

Automotive
Diesel Port Liners, Manifold Insulation, Catalyst Support Systems, Flow Separator Housings, Regenerator Cores, Turbine Nozzles

Electrical
Connector Housings, Heater And Resistor Supports, Stand-Offs, Instrument and Appliance Insulators, Coil Forms and Bobbins

Electronics
Wafer Chucks, Insulators, Vacuum Tube Structures, Microwave Housings, Arc Barriers, X-Ray Equipment, and PVD Applications

Heat Treating
Brazing/Carburizing Fixtures, Induction Heating Tubes, Furnace and Tooling Insulation, Kiln Furniture, Welding Jigs, Hot Forming Dies

Metallurgical
Molten Metal Crucibles, Nozzles, Troughs, Liners, Transfer Rollers, Structural Parts, Filters, Thermocouple Sheaths, Permanent Molds

Petrochemical
High Temperature Corrosion and Wear-Resistant Components

Plastics
Hot Die Parts for Thermoplastic Forming Equipment

MACHINABLE GRADES

502-400 Glass-Ceramic
Recommended for high dielectric strength and temperatures to 750 °F (400 °C). Used for high voltage insulators, coil forms, soldering fixtures, and arc barriers. Readily machined and no firing required. Plates are available from ⅛″ to 1″ thick; rods from ¼″ to 1″ diameter.

502-600 Glass-Ceramic
Recommended for high dielectric and mechanical strength requirements and temperatures to 1100 °F (593 °C). Used for high voltage insulators, lamp housings, thermal switches, and radiation parts. Readily machined and no firing required. Plates are available from ⅛″ to 1″ thick; rods from ¼″ to 1″ diameter.

502-800 Macor Glass-Ceramic
Recommended for temperatures to 1472 °F (800 °C) and peaks up to 1832 °F (1000 °C). Demonstrates low thermal conductivity, high strength, high electrical insulation, zero porosity, non-wetting, and coefficient of thermal expansion similar to most metals and sealing glasses. Machines to tight tolerances up to 0.0005″, surface finish of less than 20µin, and polishes to a smoothness of 0.5µin. Used for ultra high vacuum, aerospace, nuclear, welding, fixturing, and medical applications. Readily machined and no firing required. Bars, disks, rods and plates are available from 1⁄16″ thick up to 12″ diameter.

502-1100-UF Alumino-Silicate (Unfired)
Machined easily to close tolerances and can be used as-is or fired to increase temperature resistance and improve mechanical strength. Used for prototyping and small production runs of electrical and thermal insulators and brazing and heat-treating fixtures. Standard plates from ¼″ to 1″ thick × 12″ × 12″; rods from ¼″ to 4″ diameter × 12″; bars from 1″ × 1″ to 4″ × 4″ × 12″.

502-1400-BF Aluminum Oxide (Bisque-Fired)
Bisque-Fired ceramic is machined easily to close tolerances and can be used as-is or fired to increase mechanical and thermal properties. Plates are available from ¼″ to ¾″ thick × 6″ × 6″; rods from ¼″ to 3″ diameter × 12″ long. This ceramic offers excellent corrosion, abrasion, and electrical and thermal shock resistance. Used for producing guides, fixtures, nozzles, pump liners, shafts, valve seats, and more.

502-1600-94 & 502-1600-99 Boron Nitride
Hot-pressed 94% and 99% boron nitride provides high thermal conductivity, electrical insulation, and low coefficient of thermal expansion. Grades are non-reactive with molten salts, aluminum and other metals. Easily machined and available in plates from ¼″ to 1″ thick by 5″ × 5″, rods from ¼″ to 3″ diameter by 12″ long, and bars from ¼″ × ¼″ to 2″ × 2″ by 12″ long.

502-1800 Boron Nitride Aluminum Nitride
Hot-pressed boron nitride – aluminum nitride composite that demonstrates high thermal conductivity, dielectric strength, and abrasion resistance. Readily machined and available in rods from ¼″ to 1″ diameter × 12″ long and plates from ¼″ to 1″ thick by 5″ × 5″.

FULL-FIRED DENSE GRADES

502-676 Magnesium Oxide
This is a high density, fine grain, high purity (99.38%) magnesium oxide fabricated into thin-walled crucibles from 1″ to 6″ diameter and 1″ to 10″ high for applications to 4000 °F (2200 °C). Used for processing beta-alumina, metal alloys, piezoelectrics, and superconductors.

502-1100-FF Alumino-Silicate (Full-Fired)
Offers higher temperature resistance and improved mechanical strength over 502-1100-UF. Used for prototyping and small production runs of electrical and thermal insulators and brazing and heat-treating fixtures. Recommended for producing insulators, standoffs, feed-thrus, furnace carriers, and brazing fixtures.

502-1400-FF Aluminum Oxide (Full-Fired)
Full-fired, dense aluminum oxide offers excellent corrosion, abrasion, and electrical and thermal shock resistance. Used for producing guides, fixtures, nozzles, pump liners, shafts, valve seats, and more.

502-1900-ZTA Zirconia Toughened Alumina
This grade is made up of > 80% alumina and the balance yttria stabilized zirconia (Y-TZP). Provides some of the advantages of pure Y-TZP at a reduced price. The addition of zirconia increases greatly the fracture toughness, mechanical strength and impact resistance of the alumina. Used for pump components, bushings, bearings, and cutting tool inserts.

502-1900-MTTZ Magnesia Partially Stabilized Zirconia
This grade offers the highest level of fracture toughness of all the zirconia materials. Features include excellent fracture, corrosion, thermal shock, and wear resistance. Used for pump parts, valve components, bearings, and wear linings.

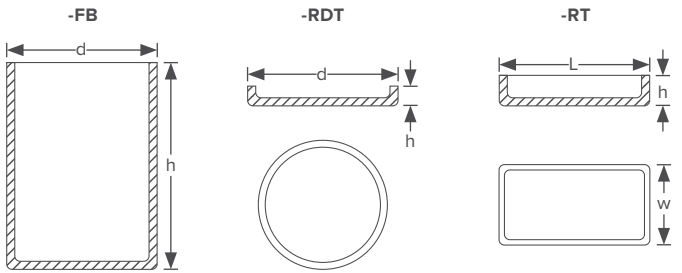
502-1900-YTZP Yttria Stabilized Zirconia
This grade offers the highest flexural strength of all the zirconia materials. The fine grain size lends itself to be used in cutting tools where a very sharp edge can be achieved and maintained due to its high wear resistance. Also provides excellent mechanical strength, corrosion and thermal shock resistance, impact toughness, and very low thermal conductivity. Used for structural components, wear parts, fiber optic ferrules and sleeves, oxygen sensors, and solid oxide fuel cells.

AREMCOLOX™ 502 SERIES CERAMICS—PRODUCT SPECIFICATIONS

Product Number	502-400	502-600	502-800	502-676	502-1100 Unfired (UF)	502-1100 Full-Fired (FF)	502-1400 Bisque-Fired (BF)	502-1400 Full-Fired (FF)	502-1600[1] 94%	502-1600[1] 99%	502-1800	502-1900-ZTA	502-1900-MTTZ	502-1900-YTZP
Composition	Glass Ceramic		Macor Glass Ceramic	Magnesium Oxide[1]	Alumino-Silicate		Aluminum Oxide[1,2]		Boron Nitride[3]		ALN-BN Composite	Zirconia-Toughened Al_2O_3 (Y-TZP)	MgO Partially Stabilized (3.5%) Zirconia	Yttria Stabilized (12%) Zirconia
Max Operating Temperature, °F (°C)	750 (400)	1100 (593)	1472 (800)	3270 (1800)	1000 (537)	2100 (1150)	2600 (1427)	3000 (1649)	2100 (1150)	5430 (3000)	2200 (1200) Vac 1200 (700) Air	2190 (1200)	2190 (1200)	3270 (1800)
Density, g/cc	3.0	2.8	2.52	3.45	2.4	2.3	3.0	3.9	1.9	1.7	2.43	4.3	5.85	5.85
Porosity, %	0	0	0	4.5	2.6	2.3	25	0	11	22	9	0	0	0
Thermal Conductivity, BTU-in/hr-ft^2-°F (W/m-K)	6 (.9)	4 (.6)	10.16 (1.46)	15 (2.2)	11 (1.6)	9 (1.3)	30 (4.3)	220 (31.7)	382 (55)	153 (22)	278 (40)	186 (27)	15 (2.2)	15 (2.2)
Thermal Expansion, in/in/°F x 10^{-6} (°C)	6.0 (10.8)	5.2 (9.5)	7.0 (12.6)	7.7 (13.9)	2.5 (4.5)	2.9 (5.2)	3.5 (6.3)	3.5 (6.3)	2.2 (4.0)	0.2 (0.3)	3.1 (5.6)	4.6 (8.3)	5.6 (10.1)	5.8 (10.5)
Compressive Strength, psi	45,000	32,000	50,000	120,000	12,000	25,000	9,000	340,000	10,000	4,800	—	421,000	254,000	363,000
Flexural Strength, psi	13,000	14,000	13,600	35,000	4,500	10,000	4,000	46,000	7,500	2,800	18,200	65,000	60,000	30,000
Hardness, Moh's Scale	5.5	5	—	5.5	1–2	6	1–2	9	—	—	—	16	8	8
Dielectric Strength, volts/mil (AC)	730	380	785	150	80	100	80	225	1,340	865	1,090	228	240	228
Dielectric Loss at 1 MHz	0.009	0.012	~0.005	—	0.06	0.053	0.003	0.0018	< 0.0002	< 0.0002	—	0.0005	0.001	0.001
Dielectric Constant at 1 MHz	6.7	6.8	~6.0	9.6	5.8	5.3	5.5	9.3	4.1	3.8	6.4	10.6	28	29

Reference Notes

[1] Super-Heat™ 502-676 and Aremcolox™ 502-1400-FF slip cast crucibles are available in stock shapes up to 6″ diameter and 10″ high. Wall thickness is 0.2″ maximum, typically 0.09″ to 0.15″. Tolerances on outside dimensions are ± 0.125″ or ± 5%, whichever is less.



FLAT BOTTOM | **CRUCIBLE COVER (OR ROUND TRAY)** | **RECTANGULAR TRAY**

Flanged lids are available for all stock shapes.
Super-Heat™ crucibles are not resistant to thermal shock. Creep occurs above 2200 °F (1200 °C), so crucibles should be supported using MgO sand to prevent sagging. The maximum recommended ramp rate is 200 °C per hour.

[2] 502-1400-FF Alumina Fasteners

Size	Destructive Torque (in-lbs)	Tensile Strength (psi)
4–40	2.4	4,400
6–32	3.3	5,000
8–32	7.4	7,000
10–32	11.7	8,000
¼–20	14.6	Not Available

The destructive torque is the force at which the bolt head shears off upon tightening.

[3] Boron Nitride operates to a maximum of 850 °C in an oxidizing atmosphere and as high as 3000 °C in a reducing atmosphere. BN 94% contains a calcium borate binder which has a melting point near 1150 °C, the maximum use temperature in a vacuum/inert atmosphere. BN 99% binderless diffusion-bonded product is stable to 1600 °C in a 10^{-3} vacuum. BN 99% may be stable up to 3000 °C as long as it is in the presence of an inert gas whose vapor pressure exceeds the vapor pressure of BN at that temperature. BN 99% is stable in dry hydrogen only.

Boron Nitride Vapor Pressure

Temp. (°C)	Vacuum (Torr)
200	3.1×10^{-25}
500	3.1×10^{-17}
800	6.8×10^{-12}
1200	9.9×10^{-7}
1600	8.1×10^{-3}
2000	11.5

Send engineering drawings to Aremco for quotation on fabricated parts.

MACHINING GUIDELINES FOR MACHINABLE CERAMICS

Fixturing
Hold parts carefully to prevent chipping or cracking. Place soft paper sheet in between ceramic and gripping jaws as needed. Support plates for drilling or milling operations using a soft backup block and mounting adhesive such as Aremco's Crystalbond 509™ or 590 (refer to Technical Bulletin A9). Support cylinders using an internal metal sleeve. Do not use pointed screws to hold parts.

Lubricant
Dry machining is recommended for 502-1100, 502-1400, 502-1600 and 502-1800 because these ceramics have high open porosity and absorb water readily. A low concentrate water-soluble lubricant is recommended for 502-400, 502-600 and 502-800.

Cleaning
When coolant is used, bake out parts at 200–250 °F for 1–2 hours to remove residual moisture. Remove any discoloration caused by the lubricant by clean firing up to 1000 °F.

Cutting
Use sharp cutting tools only as ceramics are abrasive by nature. Dull cutters may cause localized heating and lead to chipping. Carbide tools (Titanium coated or Tungsten) and/or bonded diamond wheels are preferred but high-speed tools can be used for short runs. Cut down into the work, never up from the bottom. Keep speed from 2000–2500 rpm and advance the cut by feel. The wheel should cut steadily without dragging.

Drilling
Solid carbide drills, preferably with micro-grain carbide, will give best results. Do not drill thru in order to avoid chipping. For best results, work from one side, then rotate piece and work from the other side. Otherwise, allow for 1⁄16″ of extra material on drill break-thru side to allow for grinding cleanup. For large quantities, accurate two-sided hardened bushed drill jigs will provide accurate results. The drill should be advanced slowly by 1⁄4″ per turn.

Drill Size	Spindle Speed*	Feed Rate
1⁄4″	300–2000 rpm	.003–.005
1⁄2″	250–1200 rpm	.004–.007
3⁄4″	200–700 rpm	.005–.010
1″	100–300 rpm	.006–.012

*The higher end of the speed range is recommended for most products except 502-800 Macor.

Grinding
Use silicon carbide resin-bonded wheels for surface grinding at speeds recommended by the equipment manufacturer. Use a soft, coarse-grained wheel for heavy grinding. Use 1% soluble oil solution to extend life of grinding wheels. Use a 35-grit Blanchard-Besley type grinder for rough heavy grind; use a 60–80-grit wheel for surface grinders.

Milling
Micro-grain Carbide end mills are recommended.

Drill Size	Spindle Speed
1⁄4″	< 1000 rpm
1⁄2″	< 800 rpm
3⁄4″	< 600 rpm
1″	< 400 rpm

Depth of Cut .050–.070″ per cut
Feed Rate 3″ per minute

Slotting
Slotting may be accomplished using a metal-bonded diamond or silicon carbide wheel on a surface grinder for slots up to 0.050″. Alternatively, a carbide end-mill can be used making small cuts up to 0.025″ with plenty of lubricant.

Tapping
Use tungsten carbide tool bits and keep tools sharp. For internal threads, make clearance holes slightly larger than standard tap drill recommendations. Chamfer both sides of hole prior to threading to minimize chipping. Run the tap in one direction only as turning the tap back and forth can cause chipping. Continuously flush with water or coolant to clear chips and dust from the tap.

502-1100-UF Unfired—Machining & Firing Notes
Typical tolerances after firing are ± 1% or ± 0.005″ whichever is greater. Tighter tolerances can be achieved by wet grinding after firing. Machine all dimensions 1–2% undersize to allow for expansion during firing. All dimensions including centered and off-centered internal holes will increase by this percentage after firing. Maximum recommended cross-sectional thickness is 3⁄8″. Hollow cut or drill holes thru the unfired ceramic to maintain a 3⁄8″ maximum cross-section. When it is necessary to exceed 3⁄8″, do not exceed 5⁄8″ and the rate of firing should be slowed.

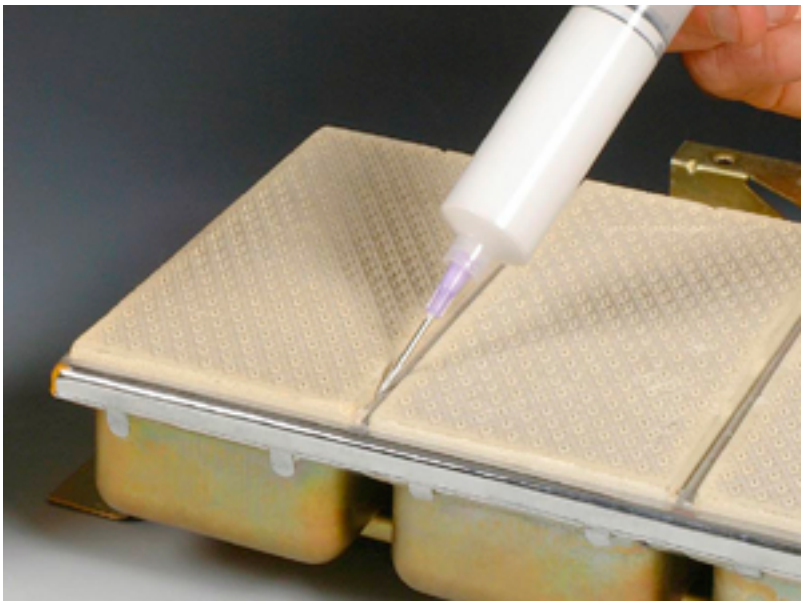
Bake at 200 °F for two hours to remove moisture and increase temperature at a rate of 200 °F per hour maximum (slower for thicker sections) to 1100 °F. Soak at 1100 °F for six hours. Increase temperature at a rate of 200 °F per hour to 2050 °F and soak for 30 minutes for each 1⁄4″ of cross-section (eg. soak a 1⁄2″ thick part for one hour). Turn off furnace and allow cooling to below 150 °F before removing parts.

502-1400-BF Bisque-Fired—Firing Notes
This product has been bisque-fired to 2475 °F, but additional firing to 3075–3125 °F can be performed to achieve high density, hardness and mechanical strength. Allow for 15–18% shrinkage using the following firing schedule. Raise temperature 500 °F per hour to 2000 °F and 200 °F per hour to 3125 °F. Soak for 12 hours then cool in furnace to room temperature before removing.

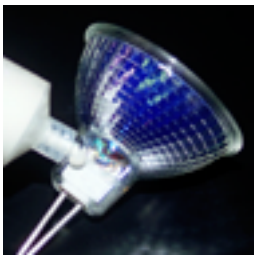
AREMCO

HIGH TEMPERATURE CERAMIC & GRAPHITE ADHESIVES

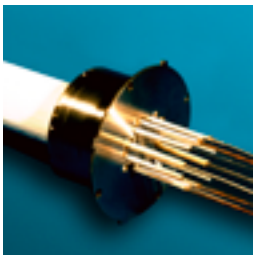
Technical Bulletin A2



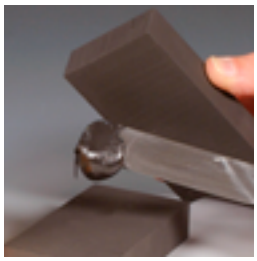
Ceramabond™ 685-N bonds infrared heater.



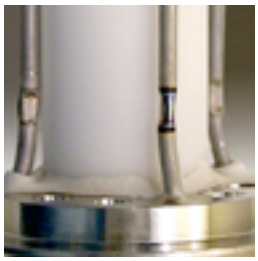
Ceramabond™ 835-M bonds halogen lamp.



Ceramabond™ 503 coats heater used to 1700 °C.



Graphi-Bond™ 551-RN bonds graphite blocks.



Ultra-Temp™ 516 seals heater assembly.

Aremco's high temperature ceramic and graphite adhesives are unique formulations for bonding, potting and sealing ceramics, composites, graphite, metals, quartz, and semiconductors for applications to 3200 °F (1760 °C).

Part No.	Filler	Bonding*	Principal Use
503	Al_2O_3	C–C	Dense Ceramics; Alumina-to-Alumina
552		C–C, C–M	Solid Oxide Fuel Cells; Low CTE Metals
569		C–C, C–M, Quartz	Probes, Sensors, Resistors, Igniters, Heaters
670		C–C, C–M	Ceramic Textiles, Thread-Locking
671		C–C, C–M, M–M	Ceramic Textiles, Thread-Locking
835-M		C–C, C–M, Quartz	Halogen Lamps
835-MB		C–C, C–M, Quartz	Halogen Lamps
865	AlN	C–C, C–M	Probes & Sensors; Thermal Conductivity
600-N	$Al_2O_3 – SiO_2$	C–C, C–M	Refractory Repair
668		C–C, C–M	Oxygen Sensors, Heaters
551-RN	Graphite	Graphite, Carbon	Reducing/Vacuum Atmosphere
669		Graphite	Oxidizing Atmosphere
571	MgO	C–M, M–M	Heaters, Induction Coils, Sensors
632	Mica	Mica	Mica Heaters
618-N	SiO_2	C–C, Quartz	Porous Ceramics, Quartz Tubes & Vessels
516	ZrO_2	C–C, C–M	Thermocouples, Semiconductor Wafers
685-N		C–C, C–M	Gasketing, Heaters, Igniters
835		C–C, C–M	Halogen Lamps
885		C–C	Zirconia, Solid Oxide Fuel Cells
890	SiC	C–C	Crucibles, Heaters, Sagger Plates

*C–C = Ceramic-to-Ceramic C–M = Ceramic-to-Metal M–M = Metal-to-Metal

TYPICAL APPLICATIONS

Electrical

- Halogen Lamps
- Heaters
- Igniters
- Fiberoptics
- Resistors
- Solid Oxide Fuel Cells

Instruments & Sensors

- Gas Chromatographs
- High Vacuum Components
- Liquid Metal Inclusion Counters
- Mass Spectrometers
- Oxygen Analyzers
- Strain Gauges
- Semiconductors
- Temperature Probes

Mechanical

- Ceramic Honeycombs
- Ceramic Textiles
- Graphite Blocks
- Refractory Insulation
- Sagger Plates
- Thread-Locking

HIGH TEMPERATURE CERAMIC & GRAPHITE ADHESIVES PROPERTIES

Part Number		503	552	569	670	671	835-M	835-MB	600-N	668	865
Tradename		Ceramabond™									
Major Constituent		Al_2O_3							$Al_2O_3 – SiO_2$		AlN
Color		White	White	White	White	White	White	White	Tan	White	Gray
Temperature Limit, °F (°C)		3000 (1650)	3000 (1650)	3000 (1650)	3000 (1650)	3200 (1760)	3000 (1650)	3000 (1650)	3000 (1650)	2500 (1371)	3000 (1650)
No. Components		1	1	1	1	1	1	2	1	1	1
Viscosity, cP		50,000–90,000	53,000–73,000	Paste	2,500–5,000	40,000–80,000	30,000–40,000	40,000–80,000	5,000–15,000	40,000–80,000	Paste
Specific Gravity, g/cc		2.35–2.55	1.90–2.20	2.15–2.30	1.80–1.95	2.05–2.15	2.35–2.45	2.00–2.15	2.00–2.05	2.20–2.40	1.95–2.15
CTE, in/in/°F × 10^{-6} (°C)		4.0 (7.2)	4.3 (7.7)	4.2 (7.6)	4.3 (7.7)	4.3 (7.7)	4.0 (7.2)	3.8 (6.8)	3.0 (5.4)	4.0 (7.2)	1.5 (2.7)
Handling	**Mix Ratio,** powder:liquid	NA	NA	NA	NA	NA	NA	100 : 60–80	NA	NA	NA
Handling	**Thinner**	503-T	552-T	569-T	670-T	671-T	835-M-T	835-MB-T	600-T	668-T	865-T
Handling	**Solvent**	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Handling	**Application Temperature,** °F	50–90	50–90	50–90	50–90	50–90	50–90	50–90	50–90	50–90	50–90
Handling	**Storage Temperature,** °F	40–90	40–90	40–90	40–90	40–90	40–90	40–90	40–90	40–90	40–90
Handling	**Shelf Life,** months	6	6	6	6	6	6	6	6	6	6
Curing	**Air Set,** hrs	≤ 1	1–4	1–4	1–4	1–4	1–4	1–4	1–4	1	1–4
Curing	**Heat Cure,** °F, hrs	200, 2 + 500, 2 + 700, 2	200, 2 + 500, 2	200, 2	200, 2	200, 2	200, 2	200, 2 + 350, 2 + 500, 2	200, 2 + 350, 1	200, 1–4	200, 2 + 350, 2 + 500, 2
Dielectric Strength, volts/mil @ RT		171	173	138	142	182	163	202	203	118	187
Torque Strength, ft-lbs[1]		60	52	38	60	57	63	27	14	38	27
Moisture Resistance[2]		Good	Excellent	Excellent	Excellent	Excellent	Good	Good	Excellent	Excellent	Excellent
Alkali Resistance[2]		Fair	Good	Good	Good	Excellent	Excellent	Excellent	Good	Excellent	Good
Acid Resistance[2]		Excellent	Good	Excellent	Good	Good	Good	Good	Good	Good	Good

Footnotes

[1] Tested using a torque wrench after bonding a pre-oxidized ½″–13 nut and bolt and final curing at 1000 °F.

[2] Properties were evaluated after curing at 700 °F for 2 hours.

General Notes

[1] All adhesives except 551-RN contain no volatile organic compounds (VOCs).

[2] Special pigments available upon request.

[3] Some adhesives including 503, 516, 552, 569, 571, 618-N, and 890 can be formulated using 1–5 micron ceramic powders. Add “-VFG” to the part number (eg. 503-VFG) and contact Aremco for special pricing.

Abbreviations

NA Not Applicable

NM Not Measured

HIGH TEMPERATURE CERAMIC & GRAPHITE ADHESIVES PROPERTIES

Part Number		551-RN[3,4]	669	571[5]	632	618-N	890[6]	516	685-N	835	885[6]
Tradename		Graphi-Bond™		Ceramabond™							
Major Constituent		Graphite		MgO	Mica	SiO_2	SiC	$ZrO_2 – ZrSiO_4$			
Color		Black	Black	Off-White	Tan	Off-White	Blue-Gray	Tan	Tan	Tan	Tan
Temperature Limit, °F (°C)		5400 (2985)	1400 (760)	3200 (1760)	2300 (1260)	3000 (1650)	3000 (1650)	3200 (1760)	3000 (1650)	3000 (1650)	3200 (1760)
No. Components		1	1	2	1	1	1	1	1	1	1
Viscosity, cP		Paste	20,000–40,000	20,000–90,000	10,000–25,000	40,000–60,000	35,000–55,000	40,000–70,000	5,000–20,000	20,000–40,000	10,000–20,000
Specific Gravity, g/cc		1.45–1.50	1.45–1.50	1.90–2.20	1.45–1.50	1.80–1.90	1.70–1.75	2.15–2.30	1.85–1.95	2.25–2.35	2.65–2.70
CTE, in/in/°F × 10^{-6} (°C)		4.1 (7.4)	4.2 (7.6)	7.0 (12.6)	4.7 (8.5)	.33 (.59)	2.4 (4.4)	4.1 (7.4)	4.5 (8.1)	4.0 (7.2)	4.0 (7.2)
Handling	**Mix Ratio,** powder:liquid	NA	NA	1.0:1.0, 1.5:1.0	NA	NA	NA	NA	NA	NA	NA
Handling	**Thinner**	Ethanol	669-T	571-T	632-T	618-N-T	890-T	516-T	685-N-T	835-T	885-T
Handling	**Solvent**	Ethanol	Water	Water	Water	Water	Water	Water	Water	Water	Water
Handling	**Application Temperature,** °F	40–90	50–90	50–90	50–90	50–90	50–90	50–90	50–90	50–90	50–90
Handling	**Storage Temperature,** °F	30–75	40–90	40–90	40–90	40–90	40–90	40–90	40–90	40–90	40–90
Handling	**Shelf Life,** months	6	6	6	6	6	6	6	6	6	6
Curing	**Air Set,** hrs	1–4	1–4	1–4	1–4	1–4	≤ 1	1–4	1–4	≤ 1	≤ 1
Curing	**Heat Cure,** °F, hrs	265, 4 + 500, 2	200, 2	200, 2	200, 2 + 500, 2	200, 2 + 500, 2 + 700, 2	200, 2 + 500, 2 + 700, 2	200, 2 + 500, 2 + 700, 2	200, 2	200,2	200, 2 + 500, 2 + 700, 2
Dielectric Strength, volts/mil @ RT		75	105	91	150	156	73	188	176	111	105
Torque Strength, ft-lbs[1]		30	26	22	2	77	40	50	35	50	40
Moisture Resistance[2]		Excellent	Excellent	Excellent	Good	Excellent	Good	Good	Excellent	Good	Good
Alkali Resistance[2]		Good	Good	Good	Good	Good	Good	Excellent	Good	Good	Good
Acid Resistance[2]		Good	Good	Fair	Good	Good	Good	Good	Good	Good	Good

Footnotes

[1] Tested using a torque wrench after bonding a pre-oxidized ½″–13 nut and bolt and final curing at 1000 °F.
[2] Properties were evaluated after curing at 700 °F for 2 hours.
[3] Graphi-Bond™ 551-RN is also offered in a two-part, resin and powder, system called 551-RN-X for international shipments of 1 gallon or more.
[4] Graphi-Bond™ 551-RN also demonstrates a lap-shear strength of 770 psi.
[5] Ceramabond™ 571 ranges for viscosity and specific gravity reflect a powder-to-liquid mix ratio that ranges from 1-to-1 to 1.5-to-1.
[6] Ceramabond™ 885 and 890 are also available in high pH, silicate-bonded systems. Part numbers are 885-K and 890-K. Contact Aremco for special pricing.

General Notes

[1] All adhesives except 551-RN contain no volatile organic compounds (VOCs).
[2] Special pigments available upon request.
[3] Some adhesives including 503, 516, 552, 569, 571, 618-N, and 890 can be formulated using 1–5 micron ceramic powders. Add “-VFG” to the part number (eg. 503-VFG) and contact Aremco for special pricing.

Abbreviations

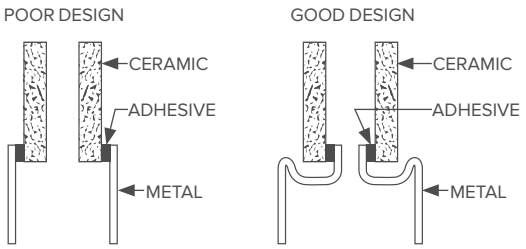
NA Not Applicable
NM Not Measured

DESIGN GUIDELINES

General design criteria for bonding with ceramic and graphite adhesives are similar to those for epoxies and other organic adhesives. Main considerations include the coefficient of thermal expansion, joint design, glue line thickness, and operating environment.

Coefficient of Thermal Expansion

CERAMIC-TO-METAL RECOMMENDED DESIGN

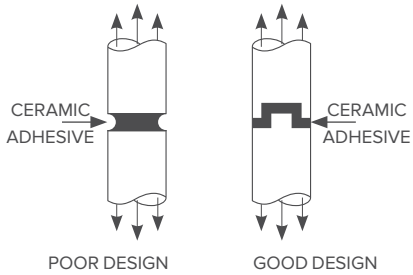


Due to the high thermal loading implicit in most ceramic adhesive applications, the joint design should account for the difference in the coefficient of thermal expansion between the adhesive and the components that are being joined. In the illustration above, note that the "poor" design loads the adhesive in tension since the metal expands faster than the ceramic. The "good" design allows for this thermal mismatch and loads the adhesion in compression, offering higher reliability.

Joint Design

Most adhesives offer relatively poor tensile-shear strength, so it is important to design a joint that will distribute the mechanical stress by maximizing the length of the glue line as shown in this illustration.

CERAMIC-TO-CERAMIC RECOMMENDED JOINT DESIGN



Glue Line Thickness

The clearance between mating parts at operating temperature should be 2–8 mils (50–200 microns). Less than 2 mils will prevent uniform adhesion; greater than 8 mils will often result in cohesive shear failure within the adhesive. A maximum depth of 0.25" is recommended when using a ceramic or graphite adhesive for a small potting application.

Operating Environment

These adhesives offer excellent chemical, electrical and ultra high thermal resistance, and do not outgas under high vacuum. The main limitations are (a) relatively low mechanical strength and (b) slight porosity after curing. Contact Aremco for suggestions about how to reduce porosity and produce gas-tight seals.

APPLICATION PROCEDURES

Surface Preparation

Smooth surfaces are difficult to bond and should be etched, abrasive blasted or oxidized, then cleaned thoroughly prior to application. Aremco's Corr-Prep™ CPR2000 is recommended for etching metals. Porous substrates should be pre-coated with a binder to prevent separation and absorption of the adhesive binder. Add a "-T" to the part number (eg. 503-T) to designate the product thinner.

Mixing

One-part adhesives tend to settle and should be mixed thoroughly prior to use. Refer to Tech Bulletin A12 for information about Aremco's Model 7000 Pneumatic Mixer. Mix ratios for two-part adhesives are shown in the Property Chart. Viscosity may be adjusted by thinning up to 20% by weight.

Application

Apply a thin coat of adhesive to each surface using a brush, spatula or dispenser. Using a clamp or similar tool, maintain a uniform glue line of 2–8 mils (200–500 microns) by applying even pressure across the assembly. Wipe away excess material prior to drying. Refer to Tech Bulletin A12 for optional dispensing tools.

Model 7000 Mixer

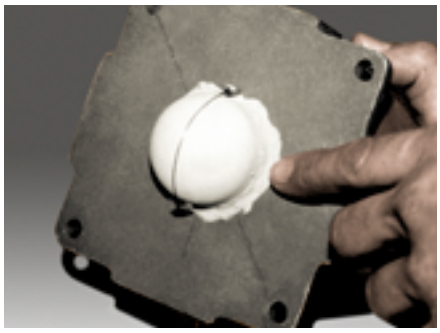
Curing

Refer to the Property Chart for specific curing instructions for each product.

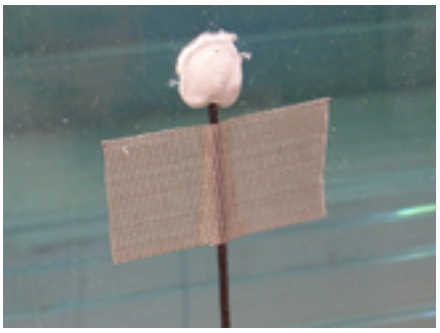
Graphi-Bond™ 551-RN seals sensor in carbon brushes.

Ceramabond™ 569 bonds flex heater to quartz vessel.

Ceramabond™ 571 coats copper induction heater.



Ceramabond™ 571 coats oxygen sensor.

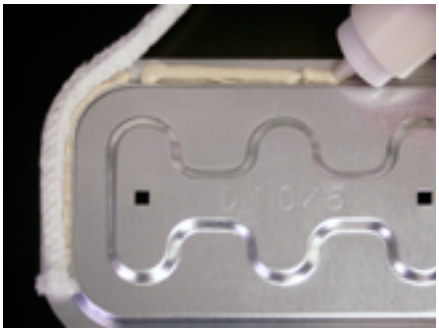


Ceramabond™ 571 bonds thermocouple to glass.

Ceramabond™ 618-N bonds porous ceramic filter elements.

Ceramabond™ 671 used as a high temp threadlocker.

Ceramabond™ 503 repairs furnace saggar plate.



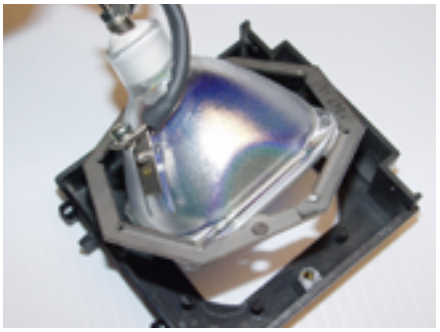
Ceramabond™ 685-N bonds ceramic gasket.

Ultra-Temp™ 516 bonds thermocouple to quartz tube.

Ceramabond™ 835 bonds halogen lamp.

Ceramabond™ 552 seals thermocouple in metal housing.

Ceramabond™ 835-M bonds cover to halogen lamp.



Ceramabond™ 835-M bonds halogen lamp.

CERAMIC ADHESIVE SELECTOR CHART

	Material	CTE °F (°C)	503	552	569	670	671	835-M	835-MB	600-N	600-HV	668	865	551-RN	669	571	632	618-N	890	516	685-N	835	885
						Al_2O_3				$Al_2O_3 – SiO_2$			AlN	Graphite		MgO	Mica	SiO_2	SiC		$ZrO_2 – ZrSiO_4$		
CERAMICS	Alumina	4.4 (7.9)	•	•	•	•	•	•	•			x				x							
	Alumina-Silica	1.8 (3.2)								x	x	•											
	Aluminum Nitride	1.5 (2.7)											•					x					
	Beryllia	4.1 (7.4)	•	x	x	x	x	x												x	x	x	x
	Boron Carbide	2.6 (4.7)	x									x							x				
	Boron Nitride	4.2 (7.6)	x																				
	Borosilicate Glass	1.8 (3.2)	x															•					
	Calcium Silicate	3.0 (5.4)				•																	
	Ceramic Textile	–				•	x														x		
	Cordierite	1.1 (2.0)																•					
	Graphite	4.3 (7.7)	x											•	•				x				
	Macor	5.2 (9.4)		x	•	x	x	x				x				x	x						
	Mica	4.7 (8.5)															•						
	Mullite	3.0 (5.4)	x	x	x	x						•								x	x	x	
	Quartz	0.30 (0.54)	x		x			x	x			x						•				x	
	Refractory, Dense	–	•																•				x
	Refractory, Light Weight	–								•	•												
	Sapphire	4.2 (7.6)	•		x	x		x	x			x											
	Silica	0.31 (0.56)										x						•					
	Silicon Carbide	2.9 (5.2)	x																•				
	Silicon Nitride	1.8 (3.2)	x									x	x					x	x				
	Steatite	4.0 (7.2)		x	•		x	x	x			x									x	•	
	Zirconia	5.7 (10.3)																		x	x	x	•
	Zirconia Silicate	4.0 (7.2)																		•	•	•	x
METALS	Aluminum	15.0 (27.0)														•							
	Brass	10.2 (18.4)														•							
	Cast Iron	5.9 (10.6)		x	x	x	x	x				x				•	x				x		
	Copper	9.3 (16.7)														•							
	Inconel	6.4 (11.5)		x	x	x	x	x				x				•							
	Molybdenum	2.9 (5.2)		x	•	x	x	x				•								x	x	x	
	Nickel	7.2 (13.0)														•							
	Nickel-Iron	2.6 (4.7)		x	•	x	x	x				•								x	x	x	
	Platinum	4.9 (8.8)	•	x	x	x																	
	Silicon	1.6 (2.9)										x	x							x	x	x	
	Silver	10.6 (19.1)														x							
	Stainless (300 Series)	9.6 (17.3)										x				x							
	Stainless (400 Series)	6.2 (11.2)		x	x	x	x	x				x				•				x	x	x	
	Steel (1010)	6.5 (11.7)		x	x	x	x	x				x				•				x	x	x	
	Tantalum	3.9 (7.0)		x	x	x	x	x				•				x				x	x	x	
	Titanium	5.8 (10.4)		x	x	x	x	x				x				•				x	x	x	
	Tungsten	2.5 (4.5)		x	•	x	x	x				•								x	x	x	

• = Preferred, x = Applicable

Refer to Price List for availability of sample kits and complete order information.

AREMCO

HIGH TEMPERATURE CERAMIC-METALLIC PASTES

Technical Bulletin A3

Pyro-Putty® High Temperature Pastes are used to seal joints and repair defects in cast aluminum, cast iron, steel and stainless steel. Formulated using the most advanced organic and inorganic-ceramic technologies, these materials resist temperatures to over 2000 °F. Applications for Pyro-Putty® are widespread and found typically in the aerospace, automotive, foundry, heat-treating, incineration, and power generation industries.

Pyro-Putty® 653 seals corroded burner manifold.

Pyro-Putty® 950 seals turbo.

Ceramic-Metallic Filled Inorganic Pastes

Pyro-Putty® 653

- Ceramic & Stainless Filled, One-Part, Water-Based Paste
- For Vertical Surfaces to ½″ Thick
- Repairs Cast Iron, Steel & Stainless Parts to 2000 °F

Pyro-Putty® 1000

- Ceramic & Aluminum Filled, Two-Part, Water-Based System
- For Vertical Surfaces to ½″ Thick
- Repairs Cast Iron, Steel & Stainless Parts to 2000 °F

Pyro-Putty® 2400

- Ceramic & Stainless Filled, One-Part, Water-Based Paste
- For Applications to ⅜″ Thick
- Repairs Cast Iron, Steel & Stainless Parts to 2000 °F

TYPICAL APPLICATIONS

- Afterburners
- Boilers
- Castings
- Exhaust Stacks
- Headers
- Incinerators
- Manifolds
- Molds and Dies
- Heat Exchangers

Ceramic-Filled Resinous Pastes

Pyro-Putty® 950

- Ceramic Fiber Filled, Organic-Resinous Gasket Seal
- For sealing High Temperature Joints to 950 °F, 750 psi
- Cures to a Tough, Pliable, Chemically Resistant Material

Pyro-Putty® 1500

- Ceramic Fiber Filled, Organic-Resinous Gasket Seal
- Seals Boiler Doors & Molten Metal Systems
- Easy to Apply & Remove, For Uses to 2300 °F

TYPICAL APPLICATIONS

- Turbines
- Boilers
- Heat Exchangers
- Compressors
- Pumps
- Blowers
- Piping
- Ducting
- Furnaces
- Ovens
- Steam Valves
- Foundry Molds

PYRO-PUTTY® PROPERTIES

Type		Ceramic-Metallic Filled Inorganic Pastes			Ceramic-Filled Resinous Pastes	
Part Number		**653**	**1000**	**2400**	**950**	**1500**
Filler		Stainless	Aluminum	Stainless	Ceramic Fiber	Ceramic Fiber
Color		Metallic Gray	Light Gray	Metallic Gray	Silver Gray	Gray Brown
Temperature Limit, °F (°C)		2000 (1093)	1400 (760)	2000 (1093)	950 (510)	2300 (1260)
Specific Gravity, g/cc		1.90	1.80	1.50	1.09	1.27
Viscosity, cP		Paste	Paste	Paste	Paste	Paste
No. Components		1	2	1	1	1
Mix Ratio, Powder:Liquid		NA	2:1	NA	NA	NA
Curing	**Air Set,** hrs	2–4	2–4	2–4	NA	1–2
Curing	**Heat Cure,** °F/hrs	200 / 3–4	160 / 1–2	200 / 2–4	400 / 1 or 225 / 6	200 / 1
Shelf Life, months		6	6	6	6	6
Storage, °F		40–90	40–90	40–90	40–90	40–90
Packaging		Pint, Quart, Gallon, 5-Gallon	Pint, Quart, Gallon, 5-Gallon	Pint, Quart, Gallon, 5-Gallon	11 oz. Tube	11 oz. Tube, Pint, Quart, Gallon, 5-Gallon

Aremco Products, Inc., 707-B Executive Boulevard, Valley Cottage, NY 10989 **T** (845) 268-0039 **E** aremco@aremco.com **W** aremco.com

Rev. 4/15

APPLICATION PROCEDURES

Surface Preparation
All surfaces must be free of oil, grease, dirt, corrosives or other contaminants before application. Porous metal castings should be baked at high temperature to burn off embedded oils. Smooth metal surfaces should be abrasive blasted with a coarse media to a minimum SP-10 near white blast (0.001" minimum profile) for best results.

Mixing
All products should be mixed thoroughly to a uniform consistency prior to use. Product viscosities may be reduced by adding a maximum of 5–10% by weight of the appropriate thinner. Thinner may be ordered by adding a "-T" to the product number (eg. 653-T). The mix ratio for Pyro-Putty® 1000 is 2.0 parts powder to 1.0–1.5 parts liquid by weight. This ratio will produce the consistency of a thick paste. Pyro-Putty® 1000 will outgas slightly after mixing and it is recommended that the mixture be limited to the amount required for a specific application. Store mixed material at room temperature in a plastic container that is approximately twice the mixture volume. Allow to outgas for 24 hours. Remix contents thoroughly prior to use. Note that mixture will not begin to harden in a closed container for over 24 hours. Hardening will initiate when mixture is removed from container and exposed to air.

Application
Pyro-Putty® products may be applied using a spatula, putty knife or caulk gun. For cross-sections greater than ⅛"–¼" multiple applications should be made to avoid blistering. Cross-sections for all products should not exceed ½"–¾" (⅜" maximum for Pyro-Putty® 2400).

Curing
The following instructions are guidelines for curing. Alternative cure times may be appropriate depending on the size of the application.

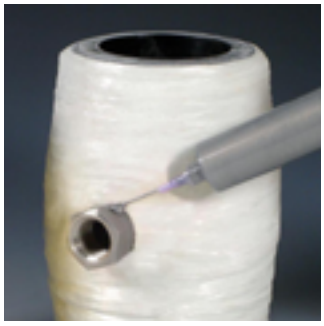
Pyro-Putty® 653
1. Air dry for 2 hours at room temperature and up to 4 hours for thick cross-sections.
2. Heat cure at 200 °F for 3 hours.
3. For multiple applications, air set for 1–2 hours between coats, then heat cure at 200 °F for 3–4 hours after the last coat.

Pyro-Putty® 950
1. This product can be cured in service at the operating temperature of the equipment.
2. For curing before service, heat cure the joint without pressure at 400 °F for 30–60 minutes or 225 °F for 4–6 hours.

Pyro-Putty® 1000
1. A heat cure is not required for cross-sections less than ⅛" thick. Air dry at room temperature for a minimum of 2–4 hours prior to use.
2. A heat cure is recommended for cross-sections greater than ⅛" thick. Air dry at room temperature for a minimum of 2–4 hours, then heat cure at 160 °F for 1–2 hours.
3. After curing, this product can be sanded to achieve a bright aluminum appearance.

Pyro-Putty® 1000 bonds heater.

Pyro-Putty® 2400 seals high temp ducting.



Pyro-Putty® 2400 seals high temp threads.

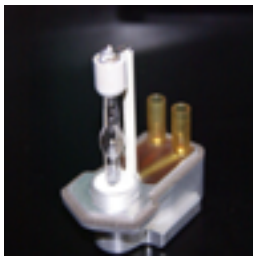
Pyro-Putty® 1500
1. This product dries at room temperature and cures in service at the operating temperature of the equipment.

Pyro-Putty® 2400
1. Air dry at room temperature for a minimum of 5–7 hours, longer for thick cross-sections.
2. A heat cure is not required if the use temperature exceeds 400 °F. Otherwise, heat cure at 200 °F for 3 hours.

Storage
Unopened containers have a six month shelf life when stored at room temperature. Make sure opened containers are capped securely to prevent evaporation. Place a plastic film in between the cap and container to prevent air leakage. The container may be inverted periodically to minimize settling. Store container between 40 °F and 90 °F.

Safety
Read Material Safety Data Sheet carefully before using any of the above products. Prolonged skin contact should be avoided due to possible irritation. In the uncured state, materials can be washed from the skin with a mild soap and water. If any material contacts eyes, flush continuously with water or neutralizing solutions, then consult a physician immediately.

Ceramacast™ 586 pots high power resistor.



Ceramacast™ 575-N bonds Xenon arc lamp.

Ceramacast™ 586 pots ignitor and cartridge heater.

Ceramacast™ 645-N fixture resists propane torch.

Ceramacast™ 673-N bonds SiC combustion nozzle.

Aremco offers the most expansive range of ceramic-based materials used for the assembly of high temperature, high power electrical devices as well as high temperature fixtures, molds and tooling. These materials, based on aluminum oxide, aluminum nitride, magnesium oxide, silicon dioxide, silicon carbide, zirconium oxide, and zirconium silicate, offer unique properties with respect to operating temperature, thermal conductivity, dielectric and mechanical strength.

Ceramacast™ products are supplied in either one-or two-part systems. One-part systems are typically mixed with water or a specialty binder system that is used to improve moisture resistance. Materials set at room temperature in several hours, then cure at ~250 °F in 2–4 hours to provide optimal electrical and mechanical properties. Two-part systems have varying set times and are similiarly cured at 250 °F in 1–2 hours.

TYPICAL APPLICATIONS

Electrical
Ballast Resistors, Cartridge Heaters, Case Resistors, Ceramic Fiber Heaters, Electrical Feed-Thrus, Gas Ignitors, Halogen Lamps, High Temp Air Filters, Infrared Heaters, PTC Devices, Rheostats, Temperature Sensors

Metallurgical
Brazing Fixtures, Crucibles, Encapsulating RF Coils, Furnace Carriers, Heating Element Holders, Induction Heating Tools, Molds for Powder Metallurgy, Rapid Prototype Molds, Sintering Boats, Standoffs, Welding Jigs

SELECTION CRITERIA

- Is the application for potting or casting?
- What is the operating temperature?
- What is the size and geometry of the part?
- Type of materials being used?
- Low or high thermal conductivity required?
- Required electrical properties?
- Mechanical strength required?
- How will the material be dispensed?
- Is the material pot life a consideration?
- Is the cure schedule a consideration?

HIGH TEMPERATURE POTTING AND CASTING MATERIALS PROPERTIES

Product Number	510	575	575-N	576-N	895	675-N	584	645-N	905[3]	673	673-N	646-N	586	900
Trade Name	Ceramacast™													
Major Constituent	Aluminum Oxide					Aluminum Nitride	Magnesium Oxide	Silicon Dioxide		Silicon Carbide		Zirconium Oxide	Zirconium Silicate	
Description	Coarse Grain Castable for Producing Large High-Temp Tooling	Fine Grain Potting Compound for Small Devices	Fine Grain Castable for High Temp Potting and Tooling	Medium Grain Castable for Large High-Temp Potting and Tooling	Fine Grain Castable for High-Temp Tooling, Good Surface Finish	Fine Grain, Thermally Conductive Potting Compound	Two-Part, Ultra Quick-Set Casting and Potting Compound	Low Thermal Conductivity, Low Expansion Potting Compound	Silicone-Silica Moisture Resistant Potting Compound	Two-Part Molding Compound, Good Thermal Conductivity	Adhesive and Potting Compound for Graphite and SiC Components	High Density, High Strength Castable and Potting Compound	High Strength, Dispensable Adhesive and Potting Compound	High Density, High Strength Molding Compound
Temperature Limit, °F (°C)	3200 (1760)	3000 (1650)	3000 (1650)	3000 (1650)	2500 (1371)	2200 (1200)	2800 (1535)	3000 (1650)	900 (482)	2500 (1371)	2500 (1371)	3000 (1650)	2800 (1535)	2800 (1535)
CTE, in/in/°F × 10^{-6} (°C)	3.9 (7.0)	4.3 (7.7)	4.3 (7.7)	4.1 (7.4)	4.0 (7.2)	2.9 (5.2)	6.5 (11.7)	1.5 (2.7)	2.0 (3.8)	3.8 (6.8)	2.9 (5.2)	3.1 (5.6)	2.7 (4.9)	2.8 (4.0)
Volume Resistivity, ohm-cm @ RT	10^9	10^9	10^9	10^9	NA	10^{13}	10^9	10^9	10^9	NA	NA	10^9	10^9	10^9
Dielectric Strength, volts/mil @ RT	75	150	150	150	NA	300	100	300	> 250	NA	NA	250	125	125
Compressive Strength, psi	8,000	7,500	11,800	10,200	8,200	2,000	4,500	7,000	NM	5,000	5,000	11,500	8,000	8,000
Porosity, %	< 7.0	< 6.0	< 2.0	< 2.0	< 6.0	< 3.0	< 6.0	< 5.0	< 1.0	< 9.0	< 4.0	< 2.0	< 2.0	< 5.0
pH	3–4	3–4	2–3	2–3	5–6	2–3	11–12	2–3	NM	5–6	2–3	2–3	2–3	5–6
Moisture Resistance	Good	Good	Good	Good	Good	Good	Good	Good	Excellent	Good	Good	Good	Good	Good
Alkali Resistance	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good
Acid Resistance[1]	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good
No. Components	1 + H_2O	1 + H_2O	1 + H_2O[2]	1 + H_2O[2]	2	1 + H_2O[2]	2	1 + H_2O[2]	2	2	1 + H_2O[2]	1 + H_2O[2]	1 + H_2O[2]	2
Mix Ratio, powder:liquid	100 : 15–19	100 : 19–22	100 : 13–15	100 : 12–14	100 : 15–17	100 : 16–18	100 : 25-30	100 : 21–23	100 : 50	100 : 17–20	100 : 13–14	100 : 12–14	100 : 13–15	100 : 15–17
Mixed Viscosity, cP	12,000	16,000	11,000	9,000	22,000	15,000	18,000	10,000	Paste	16,000	12,000	9,000	15,000	25,000
Shrinkage, % at 1000 °F	< 1.0	< 1.0	< 0.3	< 0.3	< 1.0	< 0.3	< 4.0	< 0.3	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 1.0
Pot Life, hrs	2–3	2–3	1–2	1–2	1	1–2	< 10 mins	1–2	NA	< 20 mins	1–2	1–2	1–2	< 20 mins
Shelf Life, months	12	12	12	12	12	12	1	12	905-L:6 905-P:12	12	12	12	12	12
Color	Light Gray	White	White	White	White	Light Gray	Off-White	Off-White	Off-White	Gray	Gray	Tan	Off-White	Off-White
Approximate Powder Density, lbs/gal	15	12	12.5	14.5	12	10.5	12	11	P-9.6/L-4.8	12	14.5	15.5	14	13

Reference Notes

[1] All products are attacked by hydrofluoric acid.

[2] These products can be mixed alternatively with HLB-1 Hydrophobic Liquid Binder to achieve higher moisture resistance.

[3] Ceramacast™ 905 moisture resistance, porosity and shrinkage were tested at 900 °F only.

Abbreviations

NA Not Applicable

NM Not Measured

APPLICATION PROCEDURES

Mixing

Blend powder thoroughly prior to adding water or liquid binder. Use the following mix ratios adding the water or liquid binder into the powder and mixing thoroughly until smooth and uniform Pour the mixture carefully from one side of the part. Vibrate and/or degas as required to help eliminate air bubbles. Agitate continuously or refrigerate to extend the pot life.

Product	Major Constituent	Weight Ratios			
		Powder	Liquid	Min	Max
510	Aluminum Oxide	100	Water	15	19
575	Aluminum Oxide	100	Water	19	22
575-N	Aluminum Oxide	100	Water, HLB-1	13	15
576-N	Aluminum Oxide	100	Water, HLB-1	12	14
895	Aluminum Oxide	100	LB-1	15	17
675-N	Aluminum Nitride	100	Water, HLB-1	16	18
584	Magnesium Oxide	100	584-L	25	30
645-N	Silicon Dioxide	100	Water, HLB-1	21	23
905*	Silicon Dioxide	100	905-L, 905-L1	45	55
673	Silicon Carbide	100	LB-1	17	20
673-N	Silicon Carbide	100	Water, HLB-1	13	14
646-N	Zirconium Oxide	100	Water, HLB-1	12	14
586	Zirconium Silicate	100	Water, HLB-1	13	15
900	Zirconium Silicate	100	LB-1	15	17

*Ceramacast™ 905 is offered in two standard kits. Both kits include the 905-P fused silica powder and one of two binders, 905-L or 905-L1. 905-L is a solution of silicone resin and methyl ethyl ketone that the user supplies. 905-L1 is a silicone resin powder that is mixed in a 1:1 ratio by weight with methyl ethyl ketone to make 905-L at the time of use. The 905-L1 binder is recommended for customers that are concerned about incurring hazardous freight charges associated with shipping methyl ethyl ketone.

*Ceramacast™ 905 will mix to a relatively grainy, non-pourable mixture by design. After mixing and the powder is thoroughly wet-out by the liquid binder, the mixture should be loaded to a filter bag and residual liquid squeezed out of the bag. Afterwards, the mixture should be ladled into the part and cured as recommended.

Curing

Ceramacast™ 510, 575, 673, 895, 900

1. Cover part with a plastic sheet or locate in a humidity chamber for 16–24 hours.
2. Bake at 200 °F for 3 hours.
3. Final cure at 250 °F for 3 hours.

Ceramacast™ 584

1. Material will set in less than 10 minutes. Extend pot life by chilling the liquid to ~50 °F.
2. Air dry for a minimum of 2 hours.
3. Bake at 200 °F for 2 hours.
4. Final cure at 250 °F for 3 hours.

Ceramacast™ 575-N, 576-N, 586, 645-N, 646-N, 673-N, 675-N

1. Air dry for a minimum of 8 hours.
2. Bake at 200 °F for 2–4 hours.
3. Final cure at 250 °F for 3 hours.
4. Final cure at 450 °F for 30–60 minutes when using the HLB-1 Hydrophobic Liquid Binder.

Ceramacast™ 905

1. Air dry for 12–16 hours at room temperature.
2. Bake at 150 °F for 30 minutes.
3. Bake at 250 °F for 30 minutes.
4. Bake at 350 °F for 30 minutes.
5. Final cure at 450 °F for 30 minutes.

Special Notes

1. Chemically absorbed water will remain in all products even after final curing at 250 °F. Based on thermogravimetric studies, it is expected that 100% of chemically absorbed water will be driven off in the 800–1000 °F range. Curing at higher temperatures should be performed to obtain optimal electrical resistance and mechanical strength.
2. Possible causes of cracking include (i) excessive water or liquid binder, (ii) curing is too rapid, or (iii) cross-sectional thickness is too high. Contact Aremco for assistance if cracking persists.
3. Ceramacast™ products tend to react with aluminum molds. Use EZ-Cast™ 580-N Flexible Silicone Rubber Molding Compound to avoid problems when casting ceramic parts.

Safety Precautions

1. Refer to Material Safety Data Sheets before using Aremco's Ceramacast™ or EZ-Cast™ compounds.
2. For Ceramacast™ products, avoid prolonged skin contact to prevent irritation. Wear a dust mask and work in a well-venilated area. If any material enters the eyes, flush with plenty of water and consult a physician.
3. EZ-Cast™ should be handled in a well-ventilated area wearing rubber gloves. Any spillage can be cleaned up using isopropyl alcohol. If any material gets onto the skin, wash with isopropyl alcohol or other solvent, followed by a soap and water rinse. If there is eye contact, flush with water for 10 minutes and consult a physician.

SILICONE MOLDING COMPOUNDS

Aremco's EZ-Cast™ 580N is an ideal compound for producing high reliability master molds. This silicone rubber compound exhibits high tear strength, very low shrinkage and high flexibility, all requirements for detailed reproduction.

PROPERTIES		
Upper Temp. Limit, °F (°C)		400 (204)
Lower Temp. Limit, °F (°C)		−76 (−60)
Flexibility		High
Hardness, Durometer, Shore A		45
Tensible Strength, psi		600 Min
Tear Strength, Die B lb/in		110 Min
Elongation, %		400 Min
Linear Shrinkage, %		< 0.1
Handling	**No. of Components**	2
	Mixed Viscosity, cP	30,000
	Specific Gravity, g/cc	1.3
	Mix Ratio, resin:catalyst	10:1
	Pot Life, mins	30
Shelf Life, @RT, months		6
Color		Beige Resin; Deep Red Catalyst
Weight/Gal		10 lbs resin, 1 lb catalyst

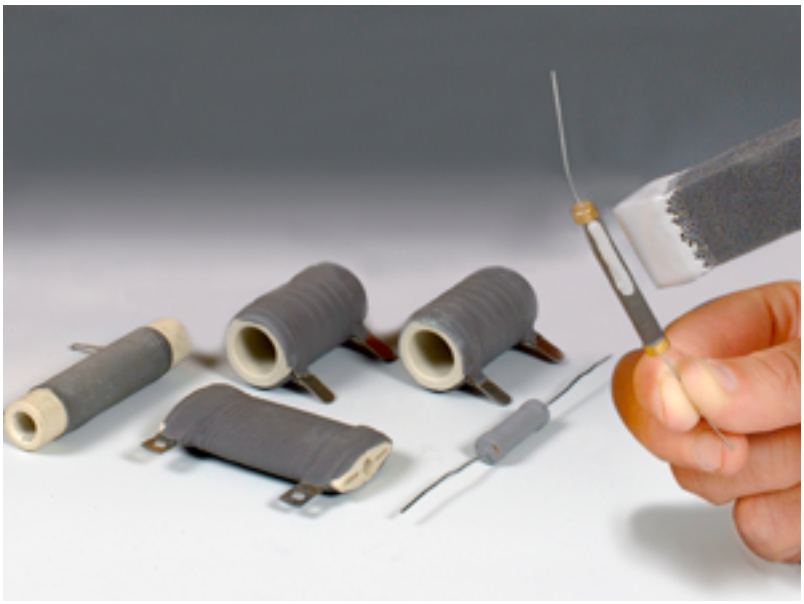
Instructions For Use

1. Machine a master pattern from aluminum and secure master into an aluminum box with removable sides. If a wooden mold is used, make sure that the mold is sealed with wax and that tapers are included to facilitate removal. *Mold should allow for a cast part wall thickness of ⅜" – ½" minimum.*
2. Premix base and activator thoroughly before blending the components together in a ratio of 10 parts base to 1 part activator.
3. Vacuum degas at 29 in Hg. The mixture will rise to about 3–4 times its original volume, then collapse. Hold vacuum for another 1–2 minutes then release.
4. Pour slowly into a master, to fill all details and prevent air entrapment. Cure for 16–24 hours at room temperature, or 3–4 hours at 120 °F, or 1–2 hours at 150 °F. In humid atmosphere, heat cure for best results.

EZ-CAST™ FLEXIBLE MOLDS IN TWO EASY STEPS

Place the machined master, a duplicate of the finished casting, into a pan, and pour the EZ-Cast™ over the master.

Cure the EZ-Cast™ mold and peel out your finished pliable mold.



Cerama-Dip™ 538N coats resistors.

PRODUCT HIGHLIGHTS

Ceramic-Inorganic

512-N Viscous, off-white paste for circuit breakers, power resistors and solenoids to 2400 °F (1316 °C).

538-N Low viscosity, light gray coating for power resistors and rheostats to 2600 °F (1427 °C). Black and green pigments also available.

Silicone

529 Transparent silicone sealer with exceptional electrical and moisture resistance to 600 °F (316 °C). High viscosity (HV) and very high viscosity (VHV) versions available. Ideal for use in cartridge heaters.

Silicone-Ceramic

CP4030 Translucent-white, low-viscosity sealer for porous materials to 900 °F (482 °C).

CP4040 Low viscosity, white coating for motor windings to 1100 °F (593 °C).

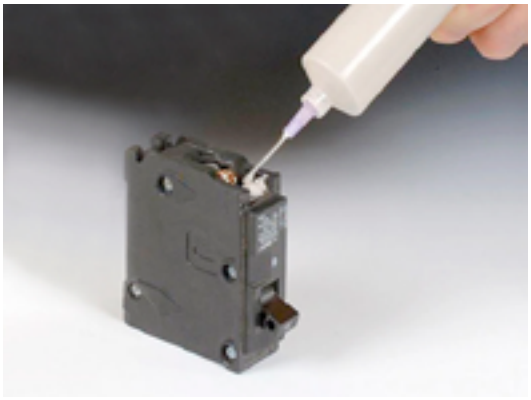
CP4050 Low viscosity, green coating for power resistors to 1100 °F (593 °C).

Silicone-Glass

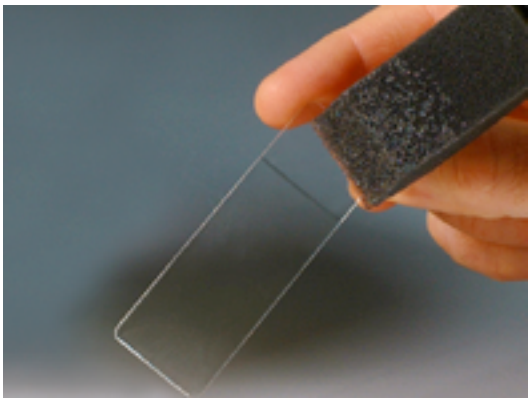
SGC4000 Silicone-glass-ceramic, gray, low viscosity, scratch resistant coating for stainless steel to 900 °F (482 °C).

Glass

GC4000 Glass-enamel, gloss-black coating for stainless steel to 1000 °F (538 °C).



Ceramacoat™ 512-N insulates circuit breaker screw.



Aremco-Seal™ 529 transparent sealer.

Cerama-Dip™ 538N-BLK coats rheostats.

HIGH TEMPERATURE ELECTRICAL COATINGS & SEALANTS

Type	CERAMIC-INORGANIC				SILICONE-CERAMIC			SILICONE			SILICONE-GLASS	GLASS
Product Number	**512-N**	**538-N**	**538-N-BLK**	**538-N-GRN**	**4030**	**CP4040**	**CP4050**	**529**	**529-HV**	**529-VHV**	**SGC4000**	**GC4000**
Tradename	Ceramacoat™	Cerama-Dip™			Aremco-Seal™	Corr-Paint™		Aremco-Seal™			Glass-Coat™	
Color (cured)	Off-White	Light Gray	Black	Green	Translucent-White	White	Green	Clear	Clear	Clear	Light Gray	Black
Maximum Temperature, °F (°C)	2400 (1316)	2600 (1427)	2600 (1427)	2600 (1427)	900 (482)	1100 (593)	1100 (593)	600 (316)	600 (316)	600 (316)	900 (482)	1000 (538)
No. Components	1	1	1	1	1	1	1	1	1	1	1	1
Viscosity, cP[1]	60,000–80,000	5,000-15,000	5,000-15,000	20,000-30,000	50–100	400–900	500–750	50–250	1,200–1,600	12,000–14,000	40–80	200–400
Specific Gravity, g/cc	1.98	1.55	1.57	1.73	1.31	1.27	1.31	1.05	1.09	1.22	1.59	1.65
Dielectric Breakdown Strength, VDC/mil	160	135	110	142	> 750	310	285	> 335	> 430	> 375	1,000	45
Solids by Weight, %	75.9	55.3	55.5	62.3	55.8	44.2	48.5	68.0	74.9	80.0	74.0	62.2
Solids by Volume, %	55.0	32.3	32.6	42.0	43.3	46.1	39.5	60.9	69.0	75.3	55.5	37.8
WFT, mils (microns)[2]	1.82 (46.2)	3.10 (78.6)	3.07 (78.0)	2.38 (60.5)	2.31 (58.6)	2.17 (55.1)	2.53 (64.3)	1.64 (41.7)	1.45 (36.8)	1.33 (33.7)	1.80 (45.8)	2.64 (67.1)
DFT, mils (microns)[3]	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)
Theoretical Dry Film Coverage[4] @ 1 mil, ft²/gal (m²/liter)	882 (21.6)	518 (12.7)	523 (12.8)	674 (16.5)	695 (17.1)	740 (18.2)	634 (15.6)	976 (24.0)	1106 (27.2)	1208 (29.6)	890 (21.8)	607 (14.9)
Curing, Min Air Set, hrs[5]	2–4	1.0	1.0	1.0	1.0	1.0	1.0	0.5–1.0	0.5–1.0	0.5–1.0	0.25	0.5
Curing, Heat Cure, °F, hrs	200, 2–4 + 350, 1–2 + 500, 1	200, 2–4 + 350, 1–2	200, 2–4 + 350, 1–2	200, 2–4 + 350, 1–2	480, 0.75	480, 0.75	480, 0.75	200, 0.5–1 + 480, .75–1	200, 0.5–1 + 480, .75–1	200, 0.5–1 + 480, .75–1	200, 0.25 + 480, 0.25 + 1000, 0.20	200, 10 Min + 1000, 20 Min + 1300, 3 Min
Application Temperature, °F	50–90	50–90	50–90	50–90	50–120	50–120	50–120	50–90	50–90	50–90	50–120	50–90
Thinner	512-N-T	538-N-T	538-N-T	538-N-T	Butyl Cellosolve/ Water	Butyl Cellosolve/ Water	Butyl Cellosolve/ Water	MEK	MEK	MEK	Ethanol	Water
Flash Point, °F/°C	NA	NA	NA	NA	> 212 (100)	> 212 (100)	> 212 (100)	77 (25)	82 (28)	86 (30)	96 (36)	NA
Volatiles, lbs/gal	0.00	0.00	0.00	0.00	0.87	0.98	0.98	2.80	2.28	2.00	3.50	0.00
Shelf Life, months	6	6	6	6	6	6	6	6	6	6	6	6
Storage Temperature, °F	55–85	55–85	55–86	55–86	55–85	55–85	55–85	40–90	40–90	40–90	40–90	40–90

Reference Notes

[1] Viscosity is measured using a Brookfield LV Viscometer.
[2] Estimated Wet Film Thickness (WFT).
[3] Recommended Dry Film Thickness (DFT).
[4] Actual coverage will vary depending on material losses during mixing and application.
[5] Where a value is provided for "Min Air Set", it is recommended that the coating set at room temperature for, at minimum, the specified time prior to curing.

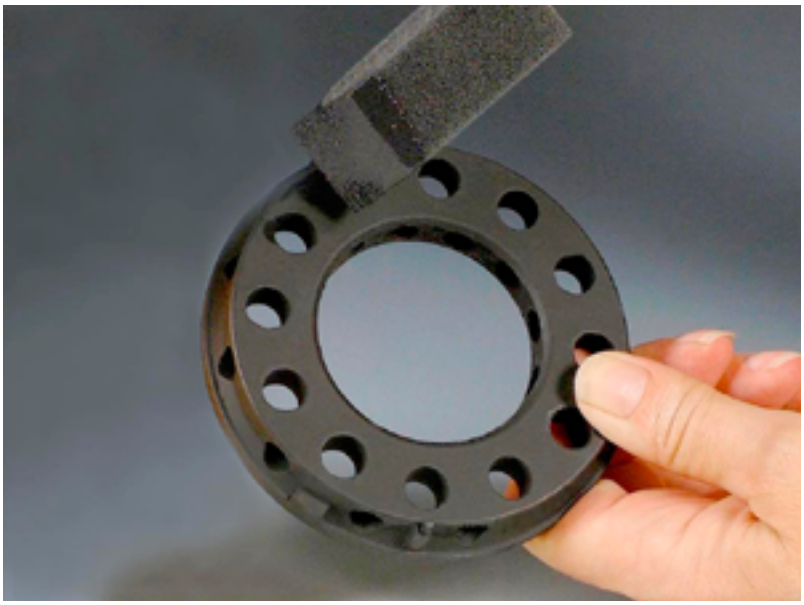
Abbreviations

NA Not Applicable
NR Not Required
DFT Dry Film Thickness
WFT Wet Film Thickness

Surface Preparation Notes

All surfaces should be free of oil, grease, dirt, corrosives, oxides, paints or other foreign matter. No further preparation is required when coating ceramics, refractories or graphites. Quartz should be sandblasted whenever possible. Smooth metal surfaces should be sandblasted or etched using Aremco's Corr-Prep™ CPR2000.

Refer to Price List for complete order information.

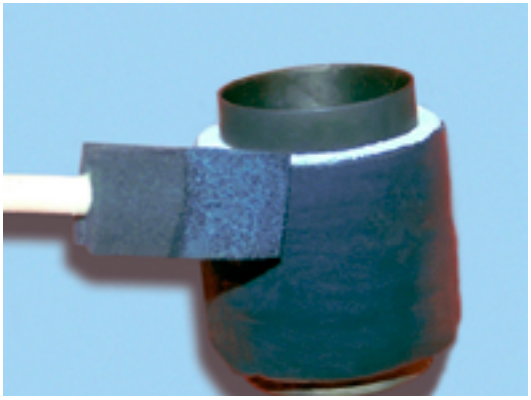


HiE-Coat™ 840-M coats gas burner component.

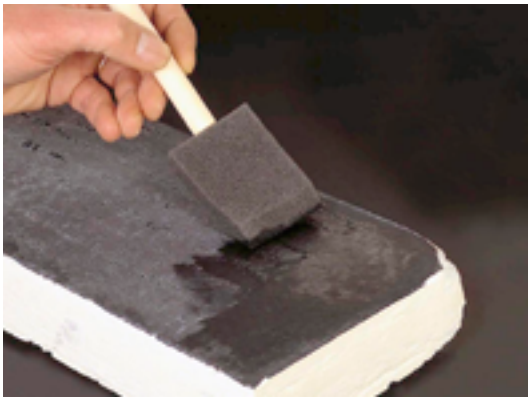
PRODUCT HIGHLIGHTS

The HiE-Coat™ line of high emissivity coatings are black-body formulations designed to significantly improve the thermal efficiency of infrared heaters, furnaces, incinerators, and ovens used throughout the appliance, ceramics, chemical processing, metallurgical, and refining industries. Natural gas and oil savings in the range of 5–10% are typical using these coatings.

840-C	Ceramic-based, black-pigmented coating for ceramic fiber modules and refractories to 2500 °F (1371 °C).
840-CM	Ceramic-based, black-pigmented coating for dense refractories to 2500 °F (1371 °C) and stainless steel to 900 °F (482 °C).
840-M	Ceramic-based, black-pigmented coating for carbon and stainless steel to 2000 °F (1093 °C).
840-MS	Silicone-ceramic, black-pigmented coating for aluminum, brass, copper, and carbon and stainless steels to 1100 °F (593 °C).



HiE-Coat™ 840-C coats exhaust pipe insulation.



HiE-Coat™ 840-C coats ceramic fiberboard infrared heater.

HiE-Coat™ 840-CM coats cast steel part.

HIGH EMISSIVITY COATINGS

Type	INORGANIC-CERAMIC			SILICONE-CERAMIC
Product Number	**840-C**	**840-CM**	**840-M**	**840-MS**
Tradename	HiE-Coat™			
Color (cured)	Jet Black	Jet Black	Jet Black	Jet Black
Maximum Temperature, °F (°C)	2500 (1371)	Ceramics: 2500 (1371) Stainless: 900 (482)	2000 (1093)	1100 (593)
No. Components	1	1	1	1
Mix Ratio, by Weight (by Volume)	NA	NA	NA	NA
Viscosity, cP[1]	70–160	600–800	600–900	250–500
Specific Gravity, g/cc	1.60	1.54	1.54	1.49
Solids by Weight, %	58.5	48.0	50.0	57.1
Solids by Volume, %	27.3	19.9	46.3	42.5
WFT, mils (microns)[2]	3.66 (92.9)	5.03 (127.7)	2.12 (54.9)	2.40 (61.0)
DFT, mils (microns)[3]	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)
Theoretical Dry Film Coverage[4] @ 1 mil, ft^2/gal (m^2/liter)	438 (10.8)	319 (7.8)	742 (18.2)	681 (16.7)
Curing, Min Air Set, hrs[5]	1.0–2.0	1.0	1.0	1.0
Curing, Heat Cure, °F, hrs	200, 1	200, 0.5 + 500 / 1	200, 1 + 500 / 1	480 / .75
Application Temperature, °F	50–90	50–90	50–90	50–120
Thinner	840-C-T	840-CM-T	840-M-T	PM Acetate
Flash Point, °F/°C	NA	NA	NA	~118 (48)
Volatiles, lbs/gal	0.0	0.0	0.0	5.3
Shelf Life, months	6	6	6	6
Storage Temperature, °F	55–85	55–85	55–85	40–90

Reference Notes

[1] Viscosity is measured using a Brookfield LV Viscometer; spindle and speed selection vary depending on the product.
[2] Estimated Wet Film Thickness (WFT).
[3] Recommended Dry Film Thickness (DFT).
[4] Actual coverage will vary depending on material losses during mixing and application.
[5] Where a value is provided for "Min Air Set", it is recommended to set the coating at room temperature for, at minimum, the specified time prior to curing.

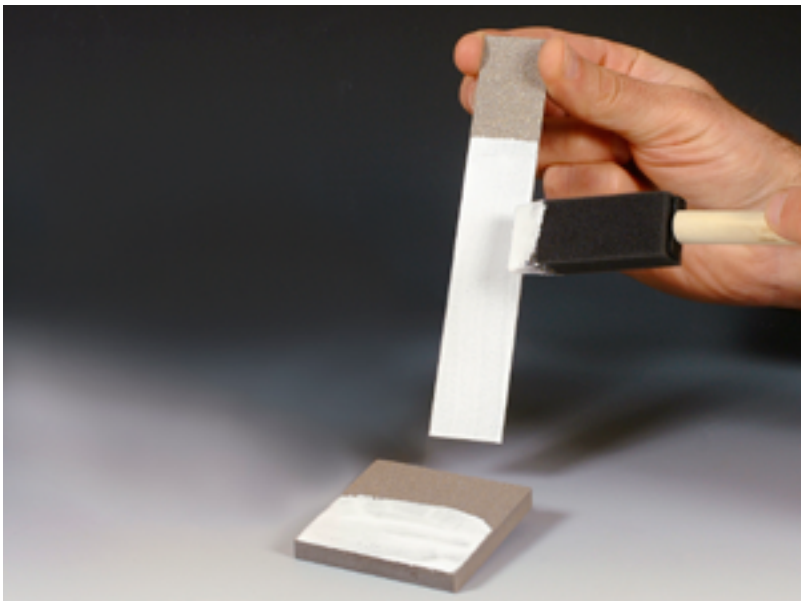
Surface Preparation Notes

All surfaces should be free of oil, grease, dirt, corrosives, oxides, paints or other foreign matter. No further preparation is required when coating ceramics, refractories or graphites. Quartz should be sandblasted whenever possible. Smooth metal surfaces should be sandblasted or etched using Aremco's Corr-Prep™ CPR2000.

Abbreviations

NA Not Applicable
NR Not Required
DFT Dry Film Thickness
WFT Wet Film Thickness

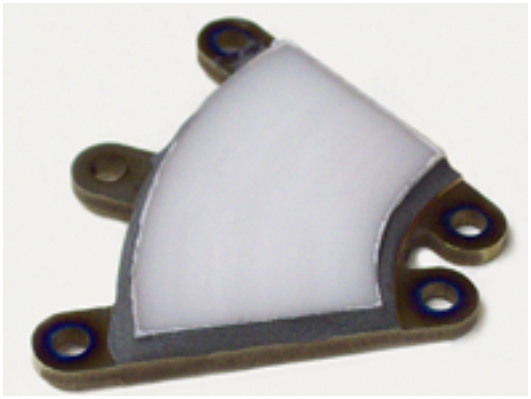
Refer to Price List for complete order information.



Ceramacoat™ 503-VFG-C applied to thermal spray substrate.

PRODUCT HIGHLIGHTS

542	Single part, low viscosity, water-dispersed, aluminum phosphate solution for penetrating ultra fine thermal spray applications to 3000 °F (1650 °C).
503-VFG-C	Single part, alumina-filled, phosphate-bonded, abrasion and corrosion resistant sealer for thermal spray applications to 3000 °F (1650 °C).
CP2000	Single part, urethane-based, gloss black, low viscosity, room temperature curing, abrasion and corrosion resistant sealer for applications to 400 °F (204 °C).
CP2070	Two part, novolac-epoxy with exceptional abrasion and corrosion resistance for continuous operations to 300 °F (150 °C) and intermittent use to 400 °F (204 °C).
CP4010	Single part, silicone-based, low viscosity, heat-curable, aluminum-filled sealer offering exceptional moisture resistance to 1100 °F (593 °C).



Ceramabind™ 542 seals thermal spray on sensor.

CP2000 seals thermal spray on small heater.

CP2000 seals thermal spray on motor housing.

HIGH TEMPERATURE THERMAL SPRAY SEALANTS

Type	INORGANIC		URETHANE	NOVOLAC-EPOXY	SILICONE
Product Number	**542**	**503-VFG-C**	**CP2000**	**CP2070**	**CP4010**
Tradename	Ceramabind™	Ceramacoat™		Corr-Paint™	
Color (cured)	Clear	White[6]	Gloss Black	Gray	Aluminum
Maximum Temperature, °F (°C)	3000 (1650)	3000 (1650)	400 (204)	300 (150)	1100 (593)
No. Components	1	1	1	2	1
Mix Ratio, by Weight (by Volume)	NA	NA	NA	100:42 (2:1)	NA
Viscosity, cP[1]	35–45	5,000–7,000	200–240	800–1000	200–600
Specific Gravity, g/cc	1.47	2.34	1.05	1.10	1.05
Solids by Weight, %	41.0	76.0	67.0	100.0	44.2
Solids by Volume, %	22.0	53.7	49.0	100.0	41.6
WFT, mils (microns)[2]	4.54 (115.3)	1.86 (47.3)	2.00 (50.5)	1.00 (25.4)	2.4 (61.0)
DFT, mils (microns)[3]	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.0 (25.4)
Theoretical Dry Film Coverage[4] @ 1 mil, ft^2/gal (m^2/liter)	353 (8.7)	861 (21.1)	722 (17.7)	1604 (39.3)	611 (14.9)
Curing, Min Air Set, hrs[5]	1.0–2.0	1.0–2.0	0.5	8.0	1.0
Curing, Heat Cure, °F, hrs	200, 1 + 500, 1 + 700, 1	200, 1 + 500, 1 + 700, 1	RT, 24 or 250, 1	RT, 24	450, 1 or 480, 0.75
Application Temperature, °F	50–90	50–90	50–90	50–90	50–120
Thinner	Water	503-T, Water	Hi-Flash Naptha	Xylene	Distilled Water
Flash Point, °F/°C	NA	NA	140 (60)	> 200 (93)	> 212 (100)
Volatiles, lbs/gal	0.00	0.00	2.86	0.00	0.86
Shelf Life, months	6	6	12	12	6
Storage Temperature, °F	55–85	55–85	40–80	40–90	55–85

Reference Notes

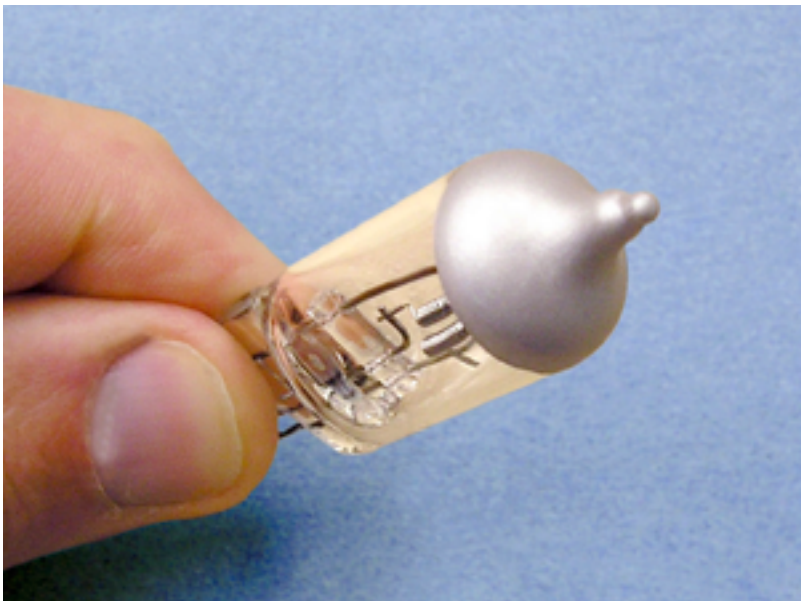
[1] Viscosity is measure using a Brookfield LV Viscometer; spindle and speed selection vary depending on the product.
[2] Estimated Wet Film Thickness (WFT).
[3] Recommended Dry Film Thickness (DFT).
[4] Actual coverage will vary depending on material losses during mixing and application.
[5] Where a value is provided for "Min Air Set", it is recommended to set the coating at room temperature for, at minimum, the specified time prior to curing.
[6] Available in dark gray, blue and other pigments upon request.

Surface Preparation Notes

All surfaces should be free of oil, grease, dirt, corrosives, oxides, paints or other foreign matter. No further preparation is required when coating ceramics, refractories or graphites. Quartz should be sandblasted whenever possible. Smooth metal surfaces should be sandblasted or etched using Aremco's Corr-Prep™ CPR2000.

Abbreviations

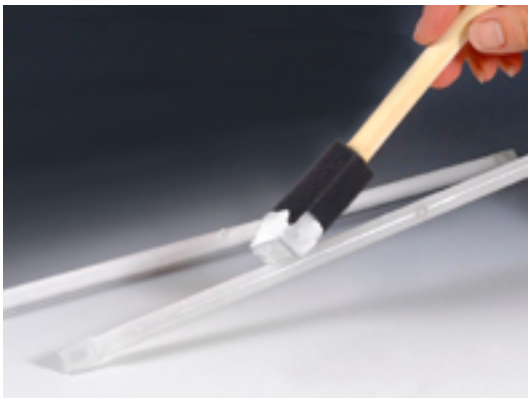
NA Not Applicable
NR Not Required
DFT Dry Film Thickness
WFT Wet Film Thickness



Lamp-Coat™ LC4010-GL applied to auto headlamp.

Lamp-Coat™ LC4040-SG applied to IR heater.

Ceramacoat™ 845-GLT applied to auto headlamp.



Quartz-Coat™ 850 applied to quartz IR heater tube.

PRODUCT HIGHLIGHTS

Ceramic-Inorganic

845	Single part, waterborne, silicon-filled, phosphate-bonded, brown-black coating for glass and quartz to 2000 °F (1093 °C). Primarily used for marking ceramic parts and coating automotive headlamps, stadium lighting and quartz vessels for the semiconductor industry. Standard viscosity is 200–400 cP; a higher viscosity coating, 845-HV, in the range of 500–800 cP is available upon request. Additional colors below are offered.
845-BLK	Jet Black
845-BLU	Cobalt Blue
845-GRY	Light-Gray
845-GLT	Light-Green
845-GDK	Dark-Green
845-SIL	Silver
845-WHT	White

Glass

613	Glass-filled adhesive/sealer for use with porous ceramics and refractories to 1150 °F (620 °C).
617	Glass-filled adhesive/sealer for use with porous ceramics and refractories to 1500 °F (816 °C).
850	Glass-ceramic filled, white reflective coating for glass and quartz to 1500 °F (816 °C).

Silicone

LC4010-BT	Aluminum-filled coating for application over black top coated headlamps to 1020 °F (550 °C).
LC4010-GL	Aluminum-filled coating for application directly over uncoated headlamps to 1020 °F (550 °C).
LC4040-SG	White reflective coating for use on mercury vapor lamps and other high temperature glass and quartz components to 1200 °F (649 °C).

HIGH TEMPERATURE COATINGS FOR CERAMICS, GLASS & QUARTZ

Type	INORGANIC-CERAMIC									GLASS			SILICONE		
Product Number	**845**	**845-HV**	**845-BLK**	**845-BLU**	**845-GRY**	**845-GLT**	**845-GDK**	**845-SIL**	**845-WHT**	**613**	**617**	**850**	**LC4010-BT**	**LC4010-GL**	**LC4040-SG**
Tradename	Quartz-Coat™		Ceramacoat™							Aremco-Seal™		Quartz-Coat™	Lamp-Coat™		
Color (cured)	Brown-Black	Brown-Black	Jet Black	Blue	Gray	Light Green	Dark Green	Matte Silver	Off-White	Light Gray	Clear	White	Silver	Silver	White
Maximum Temperature, °F (°C)	2000 (1093)	2000 (1093)	1500 (816)	1500 (816)	1500 (816)	1500 (816)	1500 (816)	1500 (816)	1500 (816)	1150 (620)	1500 (816)	1600 (871)	1020 (550)	1020 (550)	1200 (649)
No. Components	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Viscosity, cP[1]	200–400	500–800	1,000–1,500	500–1,000	400–700	750–1,250	800–1,000	400–900	400–700	1,000–2,000	1,100–1,500	500–1,000	40–50	300–400	250–500
Specific Gravity, g/cc	1.44	1.51	1.66	1.64	1.65	1.66	1.67	1.46	1.83	1.39	1.45	1.84	1.07	1.05	1.70
Solids by Weight, %	50.1	52.8	52.9	50.9	51.8	52.9	52.9	44.4	41.3	54.0	51.3	61.3	57.0	35.8	70.9
Solids by Volume, %	22.9	31.9	32.0	23.6	25.2	26.7	26.7	23.1	22.9	41.6	40.5	31.4	49.5	31.9	52.7
WFT, mils (microns)[2]	3.24 (82.3)	3.13 (79.6)	2.90 (73.8)	4.24 (107.8)	3.97 (100.8)	3.74 (95.0)	3.74 (95.0)	4.34 (110.1)	4.12 (104.6)	2.40 (61.0)	2.47 (62.7)	3.18 (80.8)	2.02 (51.3)	3.13 (79.6)	1.90 (48.2)
DFT, mils (microns)[3]	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)
Theoretical Dry Film Coverage[4] @ 1 mil, ft²/gal (m²/liter)	495 (12.2)	512 (12.6)	552 (13.6)	378 (9.3)	404 (9.9)	429 (10.5)	429 (10.5)	370 (9.1)	389 (9.6)	668 (16.4)	650 (15.9)	504 (12.4)	794 (19.5)	512 (12.6)	845 (20.8)
Curing, Min Air Set, min[5]	10	10	10	10	10	10	10	10	10	30–60	30	30	10	5	60
Curing, Heat Cure, °F, min	200, 10 + 900, 5	200, 10 + 900, 5	200, 10 + 900, 5	200, 10 + 900, 5	200, 10 + 900, 5	200, 10 + 900, 5	200, 10 + 900, 5	200, 10 + 900, 5	200, 10 + 900, 5	1150, 30	200, 30 + 350, 60 + 1650, 3	1650, 15	200, 15 + 900, 10	200, 30 + 900, 10	200, 60 + 450, 60 + 1300, 15
Application Temperature, °F	50–90	50–90	50–90	50–90	50–90	50–90	50–90	50–90	50–90	50–90	50–90	50–90	50–120	50–120	50–120
Thinner	845-T	845-T	845-T	845-T	845-T	845-T	845-T	845-T	845-T	Water	Water	Water	PM Acetate	Ethanol	PM Acetate
Flash Point, °F/°C	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	~ 118 (48)	~ 118 (48)	~115 (46)
Volatiles, lbs/gal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	6.1	3.8
Shelf Life, months	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Storage Temperature, °F	55–85	55–85	55–85	55–85	55–85	55–85	55–85	55–85	55–85	40–90	40–90	40–90	40–90	40–90	40–90

Reference Notes

[1] Viscosity is measured using a Brookfield LV Viscometer; spindle and speed selection vary depending on the product.
[2] Estimated Wet Film Thickness (WFT).
[3] Recommended Dry Film Thickness (DFT).
[4] Actual coverage will vary depending on material losses during mixing and application.
[5] Where a value is provided for "Min Air Set", it is recommended that the coating set at room temperature for, at minimum, the specified time prior to curing.

Abbreviations

NA Not Applicable
NR Not Required
DFT Dry Film Thickness
WFT Wet Film Thickness

Surface Preparation Notes

All surfaces should be free of oil, grease, dirt, corrosives, oxides, paints or other foreign matter. No further preparation is required when coating ceramics, refractories or graphites. Quartz should be sandblasted whenever possible. Smooth metal surfaces should be sandblasted or etched using Aremco's Corr-Prep™ CPR2000.

Refer to Price List for complete order information.

Aremco's refractory coatings offer the ultimate protection of high temperature components and structures used in the processing of metals, glasses and plastics.

FEATURES

- Ultra Hi-Temp Resistance
- Non-Wetted by Molten Metals, Salts, Glass & Plastics
- High Lubricity for Easy Part Release
- Minimizes Cast Surface Defects
- Increases Mold & Die Life
- For Use in Oxidizing, Reducing & Vacuum Atmospheres

APPLICATIONS

- Composite Forming
- Glass Forming
- Metal Casting
- Injection Molding
- Ceramic Hot-Pressing
- Metal Powder Sintering
- Welding
- Brazing

PRODUCT HIGHLIGHTS

Graphi-Coat™ 623
This coating system, originally patented by Aremco, is a two-part, silica-bonded, titanium diboride filled, oxidation resistant coating for protecting graphite from oxidation to 2000 °F (1093 °C). Used on graphite crucibles, heat-treating fixtures, and electrodes in the metallurgical industry.

Pyro-Paint™ 634-AS and 634-AS1
These alumina-silica based advanced coatings are rated for continuous service temperatures up to 2300 °F. Provides excellent adhesion to ceramic fiber blankets, modules and boards and resists wetting by nonferrous molten metals, increasing the durability and erosion resistance of the underlying material. High dry film thicknesses from 10–50 mils can be achieved with this coating. Select 634-AS for thin coating applications and 634-AS1 for high build applications.

Pyro-Paint™ 634-AL
This pure, alumina based compound creates a hard, high temperature resistant coating for refractory fiber boards and shapes, providing exceptional resistance to molten metals and open flames to 3200 °F (1760 °C). Increases heat reflectivity in furnaces to improve efficiency and ramp up temperatures more rapidly.

Pyro-Paint™ 634-ALP
This phosphate-bonded, alumina coating system bonds exceptionally well to dense refractory ceramics, providing high abrasion and corrosion resistance for operating temperatures to 3200 °F (1760 °C).

Pyro-Paint™ 634-BN and 634-BN(SC)
These highly-filled boron nitride solutions are extremely lubricious and inert. They are non-wetted by molten salts, glasses, plastics, and most metals including aluminum and magnesium. Select 634-BN for hard coat; 634-BN(SC) for softer, lubricious coat.

Pyro-Paint™ 634-GR
This graphite based coating is formulated for parting of aluminum permanent molds, non-sticking in glass forming applications, and lubrication and stop-off in metalworking and wire drawing. Provides superior release, surface finish and mold protection.

Pyro-Paint™ 634-SIC
This advanced silicon carbide, water-based coating reduces significantly the oxidation of graphite and carbon components and structures at temperatures to 2550 °F (1400 °C). Provides a hard surface and withstands thermal cycling.

Pyro-Paint™ 634-YO
This ultra high temperature yttrium oxide coating provides exceptional protection of graphite, ceramic and metal components exposed to reactive molten metals such as titanium, uranium and their alloys. Usable in vacuum and inert atmospheres to 2732 °F (1500 °C).

Pyro-Paint™ 634-ZO
This highly-filled zirconium oxide-based coating produces a hard, chemically-resistant protective layer which is stable with aluminum, molybdenum, platinum, rhodium, and titanium. It is ideal for sealing porous ceramics and protecting other ceramic, graphite and metal structures up to 3270 °F. Exceptional for coating resistance wire heating elements in furnaces, protecting them from residue buildup which causes arcing and reduced element life.

HIGH TEMPERATURE REFRACTORY COATINGS PROPERTIES

Part Number	623	634-AL	634-ALP	634-AS	634-AS-1	634-BN	634-BNSC	634-GR	634-SIC	634-YO	634-ZO
Tradename	Graphi-Coat™	Pyro-Paint™									
Major Constituent	Titanium DiBoride	Aluminum Oxide		Alumina-Silica		Boron Nitride		Carbon	Silicon Carbide	Yttrium Oxide	Zirconium Oxide
Color	Gray	White	White	Off-White	White	White	White	Black	Gray	Off-White	Off-White
Temperature Limit, °F (°C)	2000 (1093)	3200 (1760)	3200 (1760)	2300 (1260)	2300 (1260)	1560 (850)[1]	1560 (850)[1]	2200 (1200)	2550 (1400)	2732 (1500)	3270 (1800)
No. Components	2	2	1	1	1	1	1	1	1	1	1
Mix Ratio[2]	60 : 40	75 : 25	NA	NA	NA	NA	NA	NA	NA	NA	NA
Viscosity, cP	1,000–2,500	7,000–8,000	5,000–7,000	600–800	10,000–20,000	500–1,500	10–100	100–250	750–2,000	200–400	1,000–2,000
Specific Gravity, g/cc	2.00	2.27	2.38	1.59	1.70	1.34	1.20	1.32	2.30	1.31	2.02
Solids by Weight, %	78.0	76.8	75.8	61.2	77.0	38.6	28.5	45.5	74.5	42.7	65.0
Solids by Volume, %	57.7	66.0	73.5	63.3	70.0	21.6	27.5	29.7	53.0	23.0	35.5
Theoretical Coverage ft^2/gal @ 1 mil DFT	890	1060	1180	1015	1120	345	440	475	850	370	570
Recommended Curing **Min Air Set,** hrs **Hours Cure** °F/hrs[3]	 1 1400/0.25	 2 200/2	 1 200/2, 800/1	 2 200/2	 2 200/2	 2 200/2	 2 200/2	 2 200/2	 1 200/2, 800/1	 0.5 200/1	 2 200/2
Application Temperature, °F	50–90	50–90	50–90	50–90	50–90	50–90	50–90	50–90	50–90	50–90	50–90
Thinner[4]	623-T	634-AL-T	634-ALP-T	634-AS-T	634-AS-T	634-BN-T	634-BNSC-T	634-GR-T	634-SIC-T	634-YO-T	634-ZO-T
Coating pH	7–8	4–5	2–3	7–8	7–8	11–12	4–5	8–9	2–3	7–8	11–12
Flash Point, °F	NA	NA	NA	NA	NA	NA	NA	NA	NA	75	NA
Weight/Gallon, lbs[5]	12.5	12.0	16.5	12.0	12.5	9.5	9.5	9.5	16.5	12.0	23.5
Shelf Life, months	6	6	6	6	6	6	6	6	6	6	6
Storage Temperature, °F	40–90	40–90	40–90	40–90	40–90	40–90	40–90	40–90	40–90	40–90	40–90

Reference Notes

[1] Temperature limit applies to oxidizing atmospheres only. Can be used in vacuum/inert atmospheres to 2000 °C.
[2] Mix ratio is Powder : Liquid. Ratios may be altered as required to adjust viscosity.
[3] A short cure is recommended, however, most of these products can be air set then ramped up to operating temperature immediately.
[4] Distilled water may also be used to thin all products. Use 1–2% distilled water by weight.
[5] For two-part systems, this only refers to the weight per gallon for the powder portion of the mixture.

Abbreviations

NA Not Applicable

Refer to Price List for complete order information.

Aremco's Corr-Paint™ protective coatings include the most expansive line of high temperature organic- and ceramic-based products available on the market today for applications to 1500 °F.

Corr-Paint™ CP2000

Corr-Paint™ CP3015-SS

Corr-Paint™ CP4010

Corr-Paint™ CP4060

PRODUCT HIGHLIGHTS

Corr-Paint™ CP20XX Series

These epoxy and urethane based coatings are used for producing corrosion and wear resistant barriers to 500 °F. Typical applications include tanks, pipelines, boilers, precipitators, scrubbers, bag houses, cyclones, hoppers and other process equipment used in the power, pulp and paper, and chemical processing industries.

Urethanes: One-part, oxidation and wear-resistant coatings for applications to 400 °F.

CP2000	Jet Black
CP2010	Aluminum
CP2020	Gray

Epoxies: Two-part, high-build coatings for highly corrosive applications as high as 500 °F.

CP2050-LF	Epoxy-phenolic with long glass fibers for strength and reinforcement.
CP2050-FF	Epoxy-phenolic with fine glass fibers for smooth, uniform appearance.
CP2050-NF	Epoxy-phenolic, un-filled system for aggressive acidic conditions.
CP2060	Novolac-epoxy system with silicon carbide filler.
CP2070	Novolac-epoxy, low viscosity, gray pigmented system.

Corr-Paint™ CP30XX Series

These inorganic-ceramic, aqueous-based coatings provide outstanding resistance to thermal shock, oxidation and chemical corrosion to 1500 °F. Five basic formulations are available:

CP3015-AL	Aluminum-ceramic filled coating to 1200 °F.
CP3015-BL	High emissivity, inorganic black pigmented coating to 1500 °F.
CP3015-GR	Gray-ceramic inorganic coating to 1400 °F.
CP3015-SS	Stainless steel filled, inorganic coating to 1400 °F.
CP3015-WH	White-ceramic inorganic coating to 1500 °F.

These advanced materials are specially formulated to adhere to steel and refractory products used in boilers, furnaces, rotary calciners, kilns, stacks, and other high temperature structures. Benefits include extended equipment life, lower energy costs, and increased throughput.

Corr-Paint™ CP40XX Series

These silicone-based, heat-resistant coatings are formulated using a state-of-the-art, VOC-compliant, water-dispersible silicone resin. CP40XX Series products adhere to metals, ceramics, refractories, and quartz, and offer outstanding resistance to outdoor weathering, UV light, salt spray, chemical corrosion, thermal cycling, and temperatures to 1100 °F. Standard pigments include:

CP4000	Black*	CP4060	Red
CP4010	Aluminum*	CP4070	Blue
CP4020	Gray	CP4080	Yellow
CP4040	White	CP4090	Brown
CP4050	Green	CP4095	Orange

Custom colors are available upon request. Add "-S" to part number for solvent-borne coatings resistant to 600 °F (eg. CP4000-S); Add "-S1" to part number for solvent-borne coatings resistant to 1100 °F (eg. CP4000-S1).

Corr-Paint™ CP5000

CP5000 is a two-part, water-based, inorganic zinc-rich primer which provides superior resistance to salt-fog, immersion, impact and abrasion. This primer system is compatible with all CP-Series products and other organic topcoats. It is used for priming structural steel, marine structures, storage tanks, utility systems, and chemical process equipment and piping.

Corr-Prep™ CPR2000

This is a specially formulated, water-based, zinc phosphate metal etching solution that is non-toxic, non-flammable, non-caustic, and non-corrosive. It etches metal to provide surface profile for superior coating adhesion to aluminum, galvanized metal, steel, and stainless steel metals. It also helps to improve long-term corrosion protection. Application is simple—just brush or spray liquid on the substrate and rinse off a few minutes later and dry the substrate thoroughly.

HIGH TEMPERATURE PROTECTIVE COATINGS PROPERTIES

Type		URETHANE			EPOXY-PHENOLIC	NOVOLAC-EPOXY	
Product Number		**CP2000**	**CP2010**	**CP2020**	**CP2050-XX**[1]	**CP2060**[1]	**CP2070**
Color (cured)		Gloss Black	Aluminum	Gloss Gray	Brown-Red	Gray	Gray
Temperature Continuous, °F (°C)		400 (204)	400 (204)[2]	400 (204)[2]	400 (204)	500 (260)	300 (150)[7]
No. Components		1	1	1	2	2	2
Mix Ratio, by Weight		NA	NA	NA	1 : 1	100 : 8	100 : 42 (2 : 1 Vol)
Viscosity, cP		200–240	300–600	200–500	Paste	Paste	800–1000
Specific Gravity, g/cc		1.05	1.08	1.08	1.60	1.90	1.10
Solids by Weight, %		67.0	70.0	72.0	100.0	100.0	100.0
Solids by Volume, %		49.0	66.0	77.0	100.0	100.0	100.0
WFT, mils (microns)[3]		4.0 (101.6)	4.0 (101.6)	4.0 (101.6)	50+ (1270.0)	50+ (1270.0)	7.0 (177.8)
DFT, mils (microns)[4]		2.0 (50.8)	2.6 (67.1)	3.1 (78.7)	50+ (1270.0)	50+ (1270.0)	7.0 (177.8)
Theoretical Dry Film Coverage[5] @ 1 mil, ft^2/gal (m^2/liter)		722 (17.7)	1058 (25.9)	1235 (30.3)	1604 (39.3)	1604 (39.3)	1604 (39.3)
Primer		NR	NR	NR	NR	NR	NR
Drying	**Touch,** hrs	4–6	4–6	4–6	6–8	4	5
Drying	**Handling,** hrs	6–8	6–8	6–8	12–14	6–8	8
Drying	**Recoat, (min/max),** hrs	3/7	6/12	3/7	4/48	4/8	4/8
Curing	**Min Air Set,** hrs[6]	0.5	1	0.5	2	8	8
Curing	**Cure,** °F/hrs	RT/24 or 250/1	RT/24 or 250/1	RT/24 or 250/1	RT/48 or 175/4	RT/48 or 250/6	RT/24
Application Temperature, °F		50–90	50–90	50–90	50–90	50–90	50–90
Thinner		Hi-Flash Naptha	Hi-Flash Naptha	Hi-Flash Naptha	NR	NR	Xylene
Pot Life, hrs at room temp.		NA	NA	NA	0.70	0.75 (500g)	0.35 (200g)
Flash Point, °F (°C)		140 (60)	140 (60)	140 (60)	> 200 (93)	> 200 (93)	> 200 (93)
VOC's, lbs/gal		2.86	3.00	2.80	0.00	0.00	0.00
Shelf Life @RT, months		12	12	12	12	12	12
Storage Temperature, °F		40–90	40–90	40–90	40–90	40–90	40–90

Reference Notes

[1]

Technical Notes for Epoxy Coatings	CP2050-XX	CP2060
Lap Shear Strength to Aluminum, psi		
25 °C	2,700	2,300
100 °C	1,800	2,000
150 °C	900	1,200
175 °C	300	900
Flexural Strength, psi	13,400	11,500
Compressive Strength, psi	10,300	12,000
Elongation, %	3	2
Hardness, Shore D	86	90

[2] CP2010 will begin to discolor at 300 °F.
[3] Estimated Wet Film Thickness (WFT).
[4] Recommended Dry Film Thickness (DFT).
[5] Actual coverage will vary depending on material losses during mixing and application.
[6] Where a value is provided for "Min Air Set", it is recommended that the coating set at room temperature for, at minimum, the specified time prior to curing.
[7] Withstands intermittent service temperatures of 350–400 °F if cured for 2 hours at 185 °F.

Abbreviations

NA	Not Applicable
NR	Not Required
DFT	Dry Film Thickness
WFT	Wet Film Thickness
RT	Room Temperature

Surface Preparation Notes

All surfaces should be free of oil, grease, dirt, corrosives, oxides, paints or other foreign matter. No further preparation is required when coating ceramics, refractories or graphites. Smooth metal surfaces should be further prepared as follows:

CP20XX — Abrasive blast to an SSPC-SP5 profile or etch surface using Aremco's Corr- Prep™ CPR2000. Apply CPR2000 for a maximum of 10–15 minutes, then rinse with warm water and dry rapidly.

CHEMICAL RESISTANCE CHART

Chemical	Concentration	CP2000	CP2050	CP2060	CP2070
ACIDS					
Acetic Acid	20%	B	B	B	B
Acetic Acid	80%	B	B	B	B
Hydrochloric Acid	10%	A	A	A	A
Hydrochloric Acid	20%	A	A	A	A
Nitric Acid	10%	A	A	A	A
Nitric Acid	20%	B	B	B	B
Nitric Acid	50%	D	D	D	D
Nitric Acid	Concentrated	D	D	D	D
Phosphoric Acid	< 40%	B	A	A	A
Phosphoric Acid	40–100%	D	C	C	C
Sulfuric Acid	10%	A	A	A	A
Sulfuric Acid	10–75%	C	B	B	B
Sulfuric Acid	75–100%	D	D	D	D
BASES					
Potassium Hydroxide		A	A	A	A
Sodium Hydroxide	20%	A	A	A	A
Sodium Hydroxide	50%	A	A	A	A
Sodium Hydroxide	80%	A	A	A	A
FUELS & SOLVENTS					
Acetone		B	B	B	B
Alcohol		A	A	A	A
Crude Oil		A	A	A	A
Diesel		A	A	A	A
Gasoline		A	A	A	A
Heptane		A	A	A	A
Jet Fuel		A	A	A	A
Kerosene		A	A	A	A
Methyl Ethyl Ketone		B	B	B	B
Methylene Chloride		B	B	A	A
Toluene		A	A	A	A
Xylene		A	A	A	A

A No Effect or Excellent
B Minor Effect or Good
C Moderate Effect or Fair
D Severe Effect or Not Recommended

Refer to Price List for complete order information.

HIGH TEMPERATURE PROTECTIVE COATINGS PROPERTIES

Type		INORGANIC				
Product Number		**CP3015-AL**	**CP3015-BL**	**CP3015-GR**	**CP3015-SS**	**CP3015-WH**
Color (cured)		Aluminum	Black	Gray	Stainless Steel	White
Temperature Continuous, °F (°C)		1200 (649)	1500 (816)	1400 (760)	1400 (760)	1500 (816)
No. Components		1	1	1	1	1
Mix Ratio, by Weight		NA	NA	NA	NA	NA
Viscosity, cP[1]		250–900	600–900	600–900	200–500	600–900
Specific Gravity, g/cc		1.32	1.54	1.38	1.47	1.37
Solids by Weight, %		36.8	50.0	40.0	42.3	40.0
Solids by Volume, %		19.3	46.3	19.6	41.4	20.6
WFT, mils (microns)[2]		5.20 (131.9)	2.16 (54.9)	5.09 (129.4)	2.42 (61.4)	4.87 (123.6)
DFT, mils (microns)[3]		1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)
Theoretical Dry Film Coverage[4] @ 1 mil, ft^2/gal (m^2/liter)		309 (7.6)	742 (18.2)	315 (7.7)	664 (16.3)	330 (8.1)
Primer[5]		NR	NR	NR	NR	NR
Drying	**Touch,** hrs	1–2	1–2	1–2	1–2	1–2
Drying	**Handling,** hrs	2–4	2–4	2–4	2–4	2–4
Drying	**Recoat, (min/max),** hrs	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24
Curing	**Min Air Set,** hrs[6]	1	1	1	1	1
Curing	**Cure,** °F/hrs[7]	200/2 + 500/1	200/2 + 500/1	RT / 24	RT / 24	RT / 24
Application Temperature, °F		50–90	50–90	50–90	50–90	50–90
Thinner		CP3015-AL-T	CP3015-BL-T	CP3015-GR-T	CP3015-SS-T	CP3015-WH-T
Pot Life, hrs at room temp.		NA	NA	NA	NA	NA
Flash Point, °F (°C)		> 212 (100)	> 212 (100)	> 212 (100)	> 212 (100)	> 212 (100)
VOC's, lbs/gal		0	0	0	0	0
Shelf Life @RT, months		6	6	6	6	6
Storage Temperature, °F		40–85	40–85	40–85	40–85	40–85

Reference Notes

[1] Viscosity is measured using a Brookfield LV Viscometer, LV3 Spindle @ 30 RPM.
[2] Estimated Wet Film Thickness (WFT).
[3] Recommended Dry Film Thickness (DFT).
[4] Actual coverage will vary depending on material losses during application.
[5] Primer is only recommended for exterior applications in which salt fog or moisture are present.
[6] Where a value is provided for "Min Air Set", it is recommended to set the coating at room temperature for, at minimum, the specified time prior to curing.
[7] Curing is recommended but not absolutely required if the system is raised slowly to a minimum of 500 °F within 24–48 hours of application and not exposed to high moisture or rain during this initial dwell period.

Abbreviations

NA	Not Applicable
NR	Not Required
DFT	Dry Film Thickness
WFT	Wet Film Thickness
RT	Room Temperature

Surface Preparation Notes

All surfaces should be free of oil, grease, dirt, corrosives, oxides, paints or other foreign matter. No further preparation is required when coating ceramics, refractories or graphites. Smooth metal surfaces should be abrasive blasted to an SSPC-SP10 near white blast. Remove abrasive residue using air pressure; do not clean with organic solvents. Aremco's Corr-Prep™ CPR2000 is recommended as an alternative when sandblasting is not possible.

Refer to Price List for complete order information.

HIGH TEMPERATURE PROTECTIVE COATINGS PROPERTIES

Type		SILICONE										INORGANIC
Product Number		**CP4000**	**CP4010**	**CP4020**	**CP4040**	**CP4050**	**CP4060**	**CP4070**	**CP4080**	**CP4090**	**CP4095**	**CP5000**
Color (cured)		Flat Black	Aluminum	Gray	White	Green	Red	Blue	Yellow	Brown	Orange	Zinc
Temperature Continuous, °F (°C)		1100(593)	1100(593)	1100(593)	1100(593)	1100(593)	1100(593)	1100(593)	1100(593)	1100(593)	1100(593)	900(482)
No. Components		1	1	1	1	1	1	1	1	1	1	2
Mix Ratio, by Weight[1]		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2:1
Viscosity, cP[2]		400–800	200–600	400–800	400–900	500–750	750–950	300–600	500–700	300–500	500–700	1,250–1,750
Specific Gravity, g/cc		1.32	1.05	1.28	1.27	1.31	1.31	1.25	1.33	1.32	1.32	3.27
Solids by Weight, %		51.5	44.2	44.2	44.2	48.5	46.5	44.8	47.0	44.5	44.5	76.7
Solids by Volume, %		38.1	41.6	38.2	46.1	39.5	38.3	38.5	38.0	37.8	37.8	36.8
WFT, mils (microns)[3]		2.6 (66.5)	2.4 (61.0)	2.6 (66.4)	2.2 (55.1)	2.5 (64.3)	2.6 (66.3)	2.6 (66.3)	2.6 (66.8)	2.7 (67.2)	2.6 (64.9)	2.7 (69.1)
DFT, mils (microns)[4]		1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)
Theoretical Dry Film Coverage[5] @ 1 mil, ft²/gal (m²/liter)		611 (14.9)	668 (16.4)	613 (15.1)	740 (18.2)	634 (15.6)	614 (15.1)	617 (15.2)	610 (15.0)	606 (14.9)	628 (15.4)	589 (14.5)
Primer[6]		NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NA
Drying	**Touch,** hrs	1–2	1–2	1–2	1–2	1–2	1–2	1–2	1–2	1–2	1–2	1–2
Drying	**Handling,** hrs	2–4	2–4	2–4	2–4	2–4	2–4	2–4	2–4	2–4	2–4	2–4
Drying	**Recoat, (min/max),** hrs	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24	4 / 24
Curing	**Min Air Set,** hrs[7]	1	1	1	1	1	1	1	1	1	1	1
Curing	**Cure,** °F/hrs[8,9]	450 / 1 or 480 / .75	450 / 1 or 480 / .75	450 / 1 or 480 / .75	450 / 1 or 480 / .75	450 / 1 or 480 / .75	450 / 1 or 480 / .75	450 / 1 or 480 / .75	450 / 1 or 480 / .75	450 / 1 or 480 / .75	450 / 1 or 480 / .75	200 / 2
Application Temperature, °F		50–120	50–120	50–120	50–120	50–120	50–120	50–120	50–120	50–120	50–120	50–90
Thinner		Distilled Water	Distilled Water	Distilled Water	Distilled Water	Distilled Water	Distilled Water	Distilled Water	Distilled Water	Distilled Water	Distilled Water	Distilled Water
Pot Life, hrs at room temp.		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	≤ 24
Flash Point, °F (°C)		> 212 (100)	> 212 (100)	> 212 (100)	> 212 (100)	> 212 (100)	> 212 (100)	> 212 (100)	> 212 (100)	> 212 (100)	> 212 (100)	> 212 (100)
VOC's, lbs/gal		1.04	0.86	0.99	0.98	0.98	0.98	1.01	0.95	0.98	0.98	0.00
Shelf Life @RT, months		6	6	6	6	6	6	6	6	6	6	6
Storage Temperature, °F		55–85	55–85	55–85	55–85	55–85	55–85	55–85	55–85	55–85	55–85	55–85

Reference Notes

[1] Mix ratio is powder-to-liquid (P:L)
[2] Viscosity is measured using a Brookfield LV Viscometer, LV3 Spindle @ 30 RPM.
[3] Estimated Wet Film Thickness (WFT).
[4] Recommended Dry Film Thickness (DFT).
[5] Actual coverage will vary depending on material losses during mixing and application.
[6] Primer is only recommended for exterior applications in which salt fog or moisture are present and the operating temperature is less than 750 °F.
[7] Where a value is provided for "Min Air Set", it is recommended to set the coating at room temperature for, at minimum, the specified time prior to curing.
[8] Adequate ventilation is required when curing these products as some outgassing will occur.
[9] Curing is recommended but not absolutely required if the system is raised slowly to a minimum of 450 °F within 24–48 hours of application and not exposed to high moisture or rain during this initial dwell period.

Abbreviations

NA	Not Applicable
NR	Not Required
DFT	Dry Film Thickness
WFT	Wet Film Thickness
RT	Room Temperature

Surface Preparation Notes

All surfaces should be free of oil, grease, dirt, corrosives, oxides, paints or other foreign matter. No further preparation is required when coating ceramics, refractories or graphites. Smooth metal surfaces should be further prepared as follows:
CP40XX — Abrasive blast to an SSPC-SP6 profile.
CP5000 — Abrasive blast to an SSPC-SP10, near-white blast. Remove abrasive residue using air pressure; do not clean with organic solvents.
Aremco's Corr-Prep™ CPR2000 is recommended as an alternative when sandblasting is not possible.

Refer to Price List for complete order information.

HIGH TEMPERATURE PROTECTIVE COATINGS PROPERTIES

Type		SILICONE-POLYESTER									
Product Number		**CP4000-S**	**CP4010-S**	**CP4020-S**	**CP4040-S**	**CP4050-S**	**CP4060-S**	**CP4070-S**	**CP4080-S**	**CP4090-S**	**CP4095-S**
Color (cured)		Black	Aluminum	Gray	White	Green	Red	Blue	Yellow	Brown	Orange
Temperature Continuous, °F (°C)		600 (316)	600 (316)	600 (316)	600 (316)	600 (316)	600 (316)	600 (316)	600 (316)	600 (316)	600 (316)
Temperature Intermittent, °F (°C)		800 (427)	800 (427)	800 (427)	800 (427)	800 (427)	800 (427)	800 (427)	800 (427)	800 (427)	800 (427)
No. Components		1	1	1	1	1	1	1	1	1	1
Mix Ratio, by Weight		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Viscosity, cP[1]		400–600	300–400	200–400	300–500	250–350	500–700	150–250	300–500	400–600	550–750
Specific Gravity, g/cc		1.45	1.00	1.42	1.37	1.46	1.47	1.43	1.40	1.45	1.40
Solids by Weight, %		69.9	37.0	62.1	42.1	62.1	62.1	62.1	62.1	62.1	62.1
Solids by Volume, %		57.7	36.7	58.5	49.2	57.4	57.4	59.0	57.7	58.6	58.9
WFT, mils (microns)[2]		1.73 (44.0)	2.73 (69.2)	1.71 (43.4)	2.03 (51.6)	1.74 (44.3)	1.74 (44.3)	1.69 (43.0)	1.73 (44.0)	1.71 (43.3)	1.70 (43.2)
DFT, mils (microns)[3]		1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)
Theoretical Dry Film Coverage[4] @ 1 mil, ft²/gal (m²/liter)		925 (22.7)	589 (14.5)	938.0 (23.0)	789.7 (19.4)	920.3 (22.6)	921.1 (22.6)	946.7 (23.2)	925.6 (22.7)	940 (23.1)	944 (23.2)
Primer[5]		NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Drying	**Touch,** hrs	1–2	1–2	1–2	1–2	1–2	1–2	1–2	1–2	1–2	1–2
Drying	**Handling,** hrs	2–4	2–4	2–4	2–4	2–4	2–4	2–4	2–4	2–4	2–4
Drying	**Recoat, (min/max),** hrs	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24
Curing	**Min Air Set,** hrs[6]	1	1	1	1	1	1	1	1	1	1
Curing	**Cure,** °F/hrs[7,8]	450 / 1 or 480 / .75	450 / 1 or 480 / .75	450 / 1 or 480 / .75	450 / 1 or 480 / .75	450 / 1 or 480 / .75	450 / 1 or 480 / .75	450 / 1 or 480 / .75	450 / 1 or 480 / .75	450 / 1 or 480 / .75	450 / 1 or 480 / .75
Application Temperature, °F		50–120	50–120	50–120	50–120	50–120	50–120	50–120	50–120	50–120	50–120
Thinner		PM Acetate	PM Acetate	PM Acetate	PM Acetate	PM Acetate	PM Acetate	PM Acetate	PM Acetate	PM Acetate	PM Acetate
Pot Life, hrs at room temp.		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Flash Point, °F (°C)		118 (48)	115 (46)	115 (46)	115 (46)	115 (46)	115 (46)	115 (46)	115 (46)	115 (46)	115 (46)
VOC's, lbs/gal		3.6	5.3	3.6	3.4	3.7	3.7	3.6	3.7	3.6	3.6
Shelf Life @RT, months		6	6	6	6	6	6	6	6	6	6
Storage Temperature, °F		40–90	40–90	40–90	40–90	40–90	40–90	40–90	40–90	40–90	40–90

Reference Notes

[1] Viscosity is measured using a Brookfield LV Viscometer, LV3 Spindle @ 30 RPM.
[2] Estimated Wet Film Thickness (WFT).
[3] Recommended Dry Film Thickness (DFT).
[4] Actual coverage will vary depending on material losses during mixing and application.
[5] Primer is only recommended for exterior applications in which salt fog or moisture are present.
[6] Where a value is provided for "Min Air Set", it is recommended to set the coating at room temperature for, at minimum, the specified time prior to curing.
[7] Adequate ventilation is required when curing these products as some outgassing will occur.
[8] Curing is recommended but not absolutely required if the system is raised slowly to a minimum of 450 °F within 24–48 hours of application and not exposed to high moisture or rain during this initial dwell period.

Abbreviations

NA	Not Applicable
NR	Not Required
DFT	Dry Film Thickness
WFT	Wet Film Thickness
RT	Room Temperature

Surface Preparation Notes

All surfaces should be free of oil, grease, dirt, corrosives, oxides, paints or other foreign matter. No further preparation is required when coating ceramics, refractories or graphites. Smooth metal surfaces should be further prepared as follows:
CP40XX — Abrasive blast to an SSPC-SP6 profile.
CP5000 — Abrasive blast to an SSPC-SP10, near-white blast.
Remove abrasive residue using air pressure; do not clean with organic solvents.
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Refer to Price List for complete order information.

HIGH TEMPERATURE PROTECTIVE COATINGS PROPERTIES

Type		SILICONE									
Product Number		**CP4000-S1**	**CP4010-S1**	**CP4020-S1**	**CP4040-S1**	**CP4050-S1**	**CP4060-S1**	**CP4070-S1**	**CP4080-S1**	**CP4090-S1**	**CP4095-S1**
Color (cured)		Black	Aluminum	Gray	White	Green	Red	Blue	Yellow	Brown	Orange
Temperature Continuous, °F (°C)		1100(593)	1100 (593)	1100 (593)	1100(593)	1100(593)	1100(593)	1100(593)	1100(593)	1100(593)	1100(593)
No. Components		1	1	1	1	1	1	1	1	1	1
Mix Ratio, by Weight		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Viscosity, cP[1]		250–500	250–500	150–250	250–500	300–500	600–800	350–500	300–500	300–500	500–700
Specific Gravity, g/cc		1.49	1.00	1.35	1.34	1.36	1.34	1.35	1.36	1.38	1.37
Solids by Weight, %		57.1	41.0	57.1	57.1	57.1	57.4	56.6	56.6	56.6	56.6
Solids by Volume, %		42.5	42.4	44.4	44.4	44.3	45.1	44.3	43.4	43.2	43.4
WFT, mils (microns)[2]		2.4 (59.8)	2.4 (59.9)	2.3 (57.3)	2.3 (57.2)	2.3 (57.4)	2.2 (56.4)	2.3 (57.3)	2.3 (58.6)	2.3 (58.6)	2.3 (58.6)
DFT, mils (microns)[3]		1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)
Theoretical Dry Film Coverage[4] @ 1 mil, ft²/gal (m²/liter)		681 (16.7)	680 (16.7)	711 (17.5)	712 (17.5)	710 (17.4)	723 (17.7)	711 (17.4)	696 (17.1)	694 (17.0)	697 (17.1)
Primer[5]		NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Drying	**Touch,** hrs	1–2	1–2	1–2	1–2	1–2	1–2	1–2	1–2	1–2	1–2
Drying	**Handling,** hrs	2–4	2–4	2–4	2–4	2–4	2–4	2–4	2–4	2–4	2–4
Drying	**Recoat, (min/max),** hrs	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24
Curing	**Min Air Set,** hrs[6]	1	1	1	1	1	1	1	1	1	1
Curing	**Cure,** °F/hrs[7,8]	480 / .75	480 / .75	480 / .75	480 / .75	480 / .75	480 / .75	480 / .75	480 / .75	480 / .75	480 / .75
Application Temperature, °F		50–120	50–120	50–120	50–120	50–120	50–120	50–120	50–120	50–120	50–120
Thinner		PM Acetate	PM Acetate	PM Acetate	PM Acetate	PM Acetate	PM Acetate	PM Acetate	PM Acetate	PM Acetate	PM Acetate
Pot Life, hrs at room temp.		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Flash Point, °F (°C)		~ 118 (48)	~ 108 (42)	~ 118 (48)	~ 118 (48)	~ 118 (48)	~ 118 (48)	~ 118 (48)	~ 118 (48)	~ 118 (48)	~ 118 (48)
VOC's, lbs/gal		5.3	5.7	4.8	4.8	4.9	4.8	4.9	4.9	5.0	5.0
Shelf Life @RT, months		6	6	6	6	6	6	6	6	6	6
Storage Temperature, °F		40–90	40–90	40–90	40–90	40–90	40–90	40–90	40–90	40–90	40–90

Reference Notes

[1] Viscosity is measured using a Brookfield LV Viscometer, LV3 Spindle @ 30 RPM.
[2] Estimated Wet Film Thickness (WFT).
[3] Recommended Dry Film Thickness (DFT).
[4] Actual coverage will vary depending on material losses during mixing and application.
[5] Primer is only recommended for exterior applications in which salt fog or moisture are present.
[6] Where a value is provided for "Min Air Set", it is recommended to set the coating at room temperature for, at minimum, the specified time prior to curing.
[7] Adequate ventilation is required when curing these products as some outgassing will occur.
[8] Curing is recommended but not absolutely required if the system is raised slowly to a minimum of 450 °F within 24–48 hours of application and not exposed to high moisture or rain during this initial dwell period.

Abbreviations

NA	Not Applicable
NR	Not Required
DFT	Dry Film Thickness
WFT	Wet Film Thickness
RT	Room Temperature

Surface Preparation Notes

All surfaces should be free of oil, grease, dirt, corrosives, oxides, paints or other foreign matter. No further preparation is required when coating ceramics, refractories or graphites. Smooth metal surfaces should be further prepared as follows:
CP40XX — Abrasive blast to an SSPC-SP6 profile.
CP5000 — Abrasive blast to an SSPC-SP10, near-white blast.
Remove abrasive residue using air pressure; do not clean with organic solvents.
Aremco's Corr-Prep™ CPR2000 is recommended as an alternative when sandblasting is not possible.

Refer to Price List for complete order information.

Aremco offers an impressive selection of high performance epoxies for specialty bonding and potting applications to 600 °F. These products can be applied to a myriad of substrates, offering exceptional chemical, electrical and mechanical properties.

PRODUCT HIGHLIGHTS

Ultra High Temperature

526N Clear-Amber, 1:1 System for Tough Bonding Applications.
570 Single-Part Contact Adhesive, Excellent Flexibility.
805 Aluminum-Filled, Low Shrinkage, High Thermal Conductivity, For Bonding & Molding.
2330 Single-Part, Heat Curable, Silicone Elastomer Adhesive.
2335 Ceramic-Filled, Low Expansion, High Lap-Shear Strength & Chemical Resistance, Low Outgassing.

High Temperature, Special Purpose

568 Aluminum-Filled, 1:1, High Bond Strength, Excellent Thermal Conductivity.
631 Clear-Amber, 1:1, High Bond Strength & Corrosion Resistance.
807 10 Minute Set, Non-Sagging, 1:1, Excellent Electrical & Mechanical Properties.
820 Clear, 1:1, 45-Minute Cure System with Good Flexibility.
2150 Fast-Setting, Ceramic-Filled, High Vibration Resistance & Bond Strength.

High Temperature Potting Compounds

2315 High Temperature Resistance, Thermally Conductive, Low Viscosity.
2315X Similar to 2315 Providing Improved Crack Resistance & Bond Strength.
2318 High Temperature, Low Viscosity, Room Temperature Cure.
2340 High Temperature, Low Viscosity, Low Expansion, High Glass Transition Temperature & Chemical Resistance.

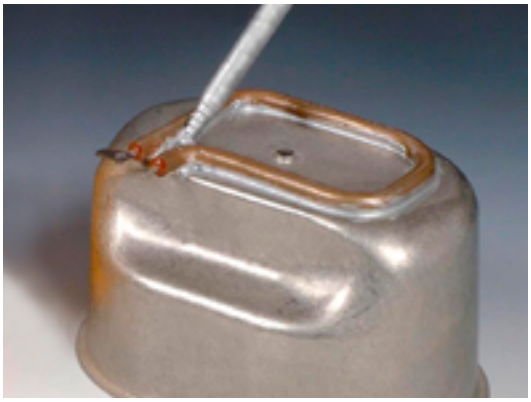
High Temperature, Maintenance & Repair

657 Stainless-Steel Filled, 1:1, High Bond Strength & Corrosion Resistance.
2200 Glass Fiber & Kevlar-Reinforced, Epoxy-Novolac, High Strength & Excellent Abrasion & Corrosion Resistance.
2210 Aluminum & Ceramic-Filled, Vibration & Impact Resistant; For Repairing Aluminum Mold & Wear Surfaces.
2220 Ceramic-Filled, High Chemical Resistance, Machinable; For Repairing Deeply Corroded Parts.

Ultra High Bond Strength

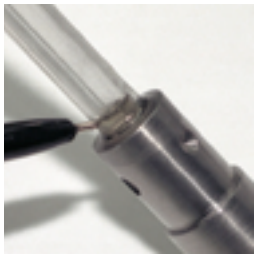
2300 Unfilled, Low Viscosity, Rubberized Epoxy, Exceptional Bond Strength & Chemical Resistance.
2310 Ceramic-Filled, 1:1, High Lap Shear & Peel Strength, Resistant to Extreme Shock, Vibration & Flexing; Ideal for Autoclave & Cryogenics.
2320 Toughened, Unfilled, Fast-Setting, BPA Free, 2:1, High Peel & Shear Strength.

Aremco-Bond™ 570 bonds ceramic to copper nozzle.

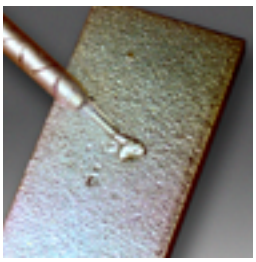


Aremco-Bond™ 568 bonds copper coil.

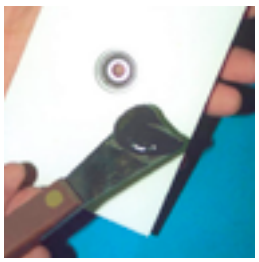
Aremco-Bond™ 526N bonds alumina to alumina ceramic.



Aremco-Bond™ 631 bonds sapphire tube to stainless steel.



Aremco-Bond™ 657-FST repairs defects in cast iron.



Aremco-Bond™ 2150 bonds ceramic wear tile.

HIGH PERFORMANCE EPOXIES PROPERTY CHART

Category		Ultra High Temperature					High Temperature, Special Purpose					High Temperature Potting Compounds				High Temperature, Maintenance & Repair				Ultra High Bond Strength		
Product Number		526N[5,6]	570	805	2330	2335	568	631[5,6]	807	820	2150	2315[6]	2315X	2318	2340	657	2200	2210	2220	2300	2310	2320
Handling & Curing	**Mix Ratio by Weight,** resin:hardener[1]	1:1	NA	100:12	NA	100:5.5	1:1	1:1	1:1	1:1	100:13	100:25	100:25	100:12	100:10	1:1	1:1	100:11	100:28	100:10	1:1	2:1
	Specific Gravity, g/cc @ 25 °C	1.23	0.95	1.66	1.43	1.80	0.85	1.12	1.39	1.15	1.50	1.95	1.95	1.58	1.76	1.65	1.60	1.80	1.70	1.10	1.35	1.10
	Mixed Viscosity, cP @ 25 °C	8,500	35,000	11,000	38,000	Paste	Paste	25,000	75,000	12,000	Paste	3,000	4,000	16,000	39,000	Paste	Paste	Paste	Paste	5,000	45,000	35,000
	Pot Life, 100 gm mass @ 25 °C, hrs	2.50	NA	≤ 1.0	NA	1.50	4.00	4.00	0.25	0.25	> 8	2.00	> 8	0.70	> 4	4.00	0.70	1.00	1.00	0.75	0.75	1.00
	Recommended Cure, hr/°F	2/200 + 2/325	.3/180 + .5/350	24/100 + 2/200	1/200	2/200 + 2/350	2/200	2/200	1/RT	.75/RT	24/RT	2/160 + 2/300	2/160 + 2/300	4/RT + 2/200	2/175 + 2/300	2/200	24–48/RT	24–48/RT	12–24/RT	2/150	2/150	24–48/RT
	Alternate Cure, hr/°F	3–4/300	24/RT + .5/350	24/RT + 2/200	.75 / 300 or .50 / 400 F	8/300	24–48/RT	24–48/RT	—	—	1/RT + 4/175	6/250	4/220	24–48/RT	6/250	24–48/RT	4/175	2/200	2/200	48/RT	48/RT	2/200
Cured Properties	**Temperature Resistance,** °F	−76 / +572	−76 / +600	−103 / +572	−76 / +572	−67 / +572	−85 / +400	−85 / +400	−67 / +266	−58 / +392	−67 / +400	−67 / +365	−67 / +365	−67 / +248	−40 / +430	−85 / +400	−67 / +400	−67 / +400	−67 / +400	−67 / +350	−67 / +325	−67 / +250
	Temperature Resistance, °C	−60 / +300	−60 / +316	−75 / +300	−60 / +300	−55 / +300	−65 / +204	−65 / +204	−55 / +130	−50 / +200	−55 / +204	−55 / +185	−55 / +185	−55 / +120	−40 / +220	−65 / +204	−55 / +204	−55 / +204	−55 / +204	−55 / +175	−55 / +165	−55 / +120
	CTE, in/in/°F x 10^{-6} °C	18 (33)	48 (86)	25 (45)	94 (170)	14 (25)	33 (60)	27 (49)	32 (59)	16 (29)	18 (32)	19 (34)	19 (34)	39 (70)	9 (16)	30 (54)	19 (34)	15 (28)	18 (32)	37 (66)	43 (77)	33 (60)
	Thermal Conductivity, Btu-in/hr-ft^2-°F	—	—	12.5	—	—	9.0	—	—	—	—	8.4	8.4	4.4	—	—	—	11.0	—	—	—	—
	Tensile Shear Strength, psi[2]	2,800	3,750	1,800	425	2,000	2,500	3,000	1,135	1,200	2,350	—	—	1,135	—	2,500	2,300	2,600	2,700	4,560	4,770	4,800
	Flexural Strength, psi[3]	18,000	ND	15,500	—	13,600	11,400	10,200	—	8,000	11,800	12,300	12,300	14,100	13,800	12,000	13,400	14,100	16,000	13,500	12,000	—
	Volume Resistivity, ohms-cm @ RT	4.0 x 10^{14}	1.0 x 10^{13}	1.0 x 10^{5}	2.0 x 10^{15}	2.0 x 10^{15}	1.0 x 10^{5}	1.2 x 10^{14}	2.0 x 10^{14}	2.0 x 10^{14}	1.0 x 10^{15}	1.0 x 10^{16}	1.0 x 10^{16}	3.0 x 10^{15}	3.8 x 10^{15}	ND	1.0 x 10^{15}	1.0 x 10^{13}	2.0 x 10^{15}	1.0 x 10^{15}	3.0 x 10^{13}	2.0 x 10^{14}
	Dielectric Strength, volts/mil	450	300	50	550	450	80	440	380	860	460	480	480	460	460	ND	460	420	480	380	410	1,100
	Dielectric Constant, 1.0 kHz	3.01	ND	ND	3.3	4.8	ND	3.12	4.4	6	4.2	4.7	4.7	4.8	4.3	ND	4.7	6.5	6.8	3.5	4.3	—
	Dissipation Factor	0.01	ND	ND	0.02	0.0007	ND	0.01	0.03	0.04	0.04	0.01	0.01	0.014	0.004	ND	0.01	0.09	0.01	0.008	0.4	—
	Chemical Resistance	Good	Excellent	Good	Good	Excellent	Excellent	Good	Excellent	Excellent	Good	Excellent	Excellent	Excellent	Excellent	Excellent	Good	Good	Very Good	Very Good	Good	Good
	Color	Amber	Black	Gray	Red	Beige	Gray	Amber	Gray	Clear	Light Gray	Black	Black	Black	Black	Gray	Rust Brown	Gray	Black	Milky Clear	Black	Off-White
	Hardness, Shore D	89	ND	87	43 (Shore A)	90	75	75	73	65	84	92	92	89	90	75	88	89	88	85	78	78
	Cure Shrinkage, in/in[4]	0.01	ND	0.003	0.003	0.0031	0.002	0.002	0.009	0.008	0.004	0.003	0.003	0.003	0.0034	0.002	0.009	0.005	0.003	0.003	0.001	0.001

Reference Notes

[1] Epoxies mixed in a 1:1 ratio are available in 50ml dual barrel cartridges. Add "-C" to part number (eg. 568-C). Request 9700 mechanical dispenser, 9800 pneumatic dispenser or 9850 plunger. Also request 9905 3.5" or 9910 6" static mixing nozzles.

[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.

[3] Tested according to ASTM D790, "Flexural Properties of Unreinforced and Reinforced and Electrically Insulating Materials, Method-L, Three Point Loading System".

[4] Linear shrinkage is measured using a ¾ lb casting mass.

[5] Also available filled with aluminum oxide, inorganic black pigment or both. Part numbers are 526N-ALOX, 631-ALOX, 526N-BL, 631-BL, 526N-ALOX-BL, and 631-ALOX-BL.

[6] Meets NASA outgassing requirements.

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. Use Aremco's 9700 or 9800 50ml dispensing systems for precise mixing of two component products.

Application: In most cases, the adhesive should be applied to both surfaces maintain a glue line of less than 10 mils. After assembling the parts, pressure should be applied to the assembly to prevent warpage and reduce air entrapment. Refer to curing guidelines in the above property chart.

Abbreviations

NA Not Applicable
ND Not Determined
RT Room Temperature

Refer to Price List for complete order information.

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

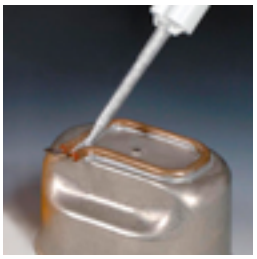
Reference Notes
[1] The low end of the service temperature range for all products is approximately −67 °F (−55°C).
[2] Tested according to ASTM D1002-94 at 25 °C, a method for determining the shear strength of a single lap-joint of metal substrates in tensile loading.

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.

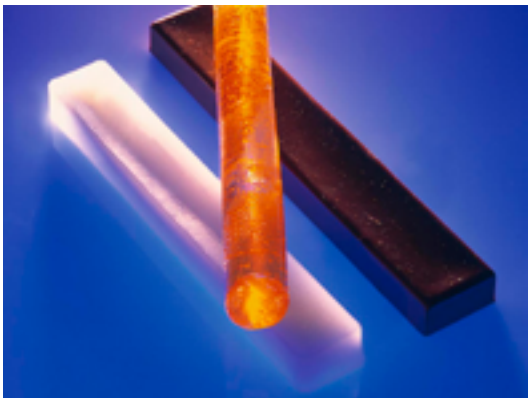
Reference Notes

[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:

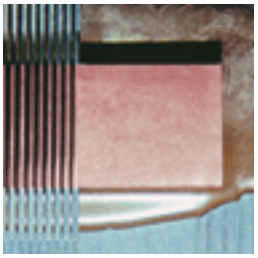
Temperature, °C (°F)	Vapor Pressure (Torr)
20 (68)	3×10^{-14}
50 (122)	2×10^{-12}
100 (212)	1×10^{-9}
200 (392)	2×10^{-6}

Refer to Price List for complete order information.

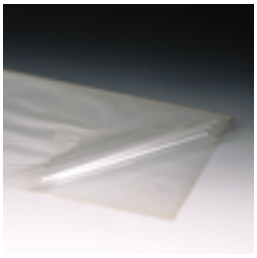
Aremco's Crystalbond™ and Wafer-Mount™ washaway adhesives are ideal materials for temporarily mounting products that require dicing, polishing, and other machining processes. These adhesives exhibit high bond strength and adhere readily to metals, glass and ceramics by simply melting with heat. When processing is complete, these adhesives are removed by reheating and cleaning with one of Aremco's environmentally-friendly cleaning agents.



Crystalbond™ 509, 555 and 590.



Crystalbond™ 590 bonds an advanced ceramic which is diced into 25–50 mil sections.



Wafer-Mount™ 562, a film adhesive, provides a uniform glue line between a ceramic substrate and mounting block.

PRODUCT HIGHLIGHTS

Crystalbond™ 509
Provides excellent adhesion and minimizes clogging of diamond tools compared to waxes. Transparent in thin cross-sections. Soluble in 509-S stripper, an odorless, non-flammable, biodegradable water-rinsable solvent. Available in three standard colors: 509-1 Light Amber, 509-2 Dark Amber, 509-3 Clear-Blue.

Crystalbond™ 555 & 555-HMP
Low melting point adhesive systems for moderate-stress machining processes, dry plasma etching of silicon wafers, de-paneling copper plated Teflon boards, and dicing ceramic green tape. Transparent in thin cross-sections. Soluble in hot water.

Crystalbond™ 590
High strength, resilient adhesive system, ideal for dicing miniature and tall parts. Soluble in isopropyl alcohol or 590-S stripper, a water-dispersible, environmentally-safe powder concentrate.

Wafer-Mount™ 559
Semi-rigid, solvent-resistant plastic film with pressure sensitive soluble adhesive layer. Ideal for scribing wafers with vacuum hold down fixturing.

Wafer-Mount™ 562
Thermoplastic film adhesive with good adhesive properties. Ideal for mounting thin, fragile substrates for which a predictable film thickness is required. Soluble in 562-S stripper, a non-flammable, biodegradable, water-rinsable solvent.

TYPICAL APPLICATIONS

- Machining advanced ceramics.
- Lapping and polishing optical components.
- Dicing ceramic substrates and semiconductor wafers.
- Dicing ferrites, glasses and piezoelectrics.
- Dicing metal and optical single crystals.
- Mounting cross-sections for scanning electron microscopy.
- Backfilling components for temporary mechanical support.
- Dry plasma etching.

PRODUCT SPECIFICATIONS

Product Number	509-1	509-2	509-3	555	555-HMP	590	559	562
Trade Name	Crystalbond™						Wafer-Mount™	
Form	Stick	Stick	Stick	Stick	Stick	Stick	Sheet	Sheet
Size	⅞″ Dia × 7″	⅞″ Dia × 7″	⅞″ Dia × 7″	½″ × 1″ × 7″	½″ × 1″ × 7″	⅝″ × 1¼″ × 7½″	0.005″ × 10″ × 10″	0.002″ × 8″ × 10″
Weight	~ 0.2 Lbs/Stick	~ 0.2 Lbs/Stick	~ 0.2 Lbs/Stick	~ 0.15 Lbs/Stick	~ 0.15 Lbs/Stick	~ 0.5 Lbs/Stick	NA	NA
Flow Point, °F (°C)	165 (74)	165 (74)	165 (74)	120 (49)	150 (66)	302 (150)	NA	200 (93)
Viscosity, cP	6,000	6,000	6,000	500	500	9,000	NA	NA
Color	Light Amber	Dark Amber	Clear-Blue	White	White	Brown	Clear	White
Solvent	509-S or Acetone	509-S or Acetone	509-S or Acetone	Hot Water	Hot Water	590-S or Isopropyl Alcohol	Acetone or Methy Ethyl Ketone	562-S

APPLICATION PROCEDURES

Crystalbond™ 509*, 555, 555-HMP, 590

1. Using a hot plate or oven, heat a ceramic or glass mounting block to the flow temperature of the selected Crystalbond™ adhesive. Make sure to work in a well-ventilated area, and do not overshoot the flow temperature, otherwise, the adhesive will begin to decompose, degrading its strength.
2. Apply a uniform layer of adhesive to the heated mounting plate and place the substrate over the adhesive. Using a weight, apply even pressure to the substrate to remove air bubbles and to ensure that the substrate is parallel to the plate. Apply a fillet of adhesive around the perimeter of the substrate to increase the holding strength.
3. Remove the mounting plate from the heat source and allow it to cool slowly to room temperature until the adhesive is hardened. Cool for 20–30 minutes before processing.
4. Dice or process the substrate as required, then remove the parts by re-heating the mounting block to the flow temperature. Use a tool to slide the substrate off the mounting plate.
5. For detailed cleaning procedures for Crystalbond™ 509 and 590, refer to the section on Crystalbond™ 509-S and 590-S Strippers. For Crystalbond™ 555 or 555-HMP, follow the Process Diagram for cleaning, substituting water for the other strippers.

*Crystalbond™ 509 can be applied as a thin, uniform film by dissolving it into a sprayable liquid. This can be accomplished by crushing the adhesive stick into a powder and mixing it into a solution of 80 parts acetone to 20 parts 509 by weight. Spray the solution onto the parts and allow the solvent to evaporate for a minimum of 5 minutes. Use a heat gun for one minute at less than 250 °F to evaporate further, then press the parts together and cool at room temperature for at least 30 minutes.

Wafer-Mount™ 559

1. Cut the Wafer-Mount™ sheet to the desired shape and size and peel the clear plastic adhesive tape away from the backing paper. Place the substrate, face down, on the backing paper then place the plastic adhesive tape, with the adhesive side down, over the part. Press firmly to assure good adhesion, then peel off the backing paper.
2. Process the substrate as required, then remove parts by heating in a well-ventilated area to 300 °F for 2–3 minutes until the adhesive softens. Use a tool to slide the substrate off the mounting plate.
3. Clean with acetone or MEK according to the process diagram for cleaning.

Wafer-Mount™ 562

1. Cut the Wafer-Mount™ sheet to the desired shape and size, and position on a ceramic or glass mounting plate. Use multiple preforms as required to fill in small cavities or gaps caused by warping of the substrate.
2. Using a hot plate or oven, heat the mounting plate to 195–210 °F. Make sure to work in a well-ventilated area, and do not overshoot the flow temperature, otherwise, the adhesive will begin to decompose and degrade in strength.
3. Using a weight, apply even pressure to the substrate to remove air bubbles and to ensure that the substrate is parallel to the plate.
4. Remove the mounting plate from the heat source and allow it to cool slowly to room temperature until the adhesive is hardened. Cool for 20–30 minutes prior to processing.
5. Process the substrate as required, then remove parts by re-heating the mounting block to the flow temperature. Use a tool to slide the substrate off the mounting plate.
6. For detailed cleaning procedures, refer to the section describing the 562-S Stripper.

APPLICATION PROCEDURES

Crystalbond™ 590-S Stripper

This stripper is an environmentally-safe, water-dispersible, powder concentrate prepared primarily for use with Crystalbond™ 590 and other mounting waxes. In addition to its ability to dissolve waxes, it can be used for the removal of silicones, greases, oils, soils, finishing compounds and normal contaminants.

Features

- Soluble in Water
- Non-Reactive with Metals
- Biodegradable
- Non-Flammable

Usage

Add 6–8 ounces of 590-S (170–225 grams) to each gallon of water and allow to dissolve completely. Heat solution to 50–70 °C and immerse parts for a minimum of 5 minutes until the Crystalbond™ 590 dissolves. Use an ultrasonic system for best results. As adhesive residue begins to concentrate in the stripper, 20% of the stripper should be replaced with fresh material. Refer to process diagram for cleaning.

Rinsing

After removing the adhesive, a step-wise, warm-rinsing process is recommended. Rinse in a dilute, non-ionic surfactant or liquid detergent system, followed by a final rinse in de-ionized water to eliminate water spots due to hard salts and contaminant redeposition.

Compatibility

The 590-S is non-reactive with ceramics, glass and metals such as brass, copper, iron, and silicon. It is reactive with strong acids.

Handling and Storage

The 590-S is biodegradable and inert. It is a caustic material, so the use of gloves and eye goggles is recommended. Keep container tightly closed and store in a cool, dry, well-ventilated area or cabinet. Isolate from incompatibles such as strong acids.

Crystalbond™ 509-S and Wafer-Mount™ 562-S Strippers

These strippers are high-performance, environmentally-safe, chemical cleaning agents developed specifically for removing Crystalbond™ 509, Wafer-Mount™ 562, and other tenacious polymer coatings and inorganic particulates.

Features

- Low Evaporation Rate
- Rinses with Water
- Non-Flammable
- Non-Reactive with Metals
- Biodegradable

Usage

These cleaning agents work best in ultrasonic systems at 50–60 °C. The evaporation rate is much slower than acetone, so a good lifecycle will be achieved in comparison. As adhesive residue begins to concentrate in the stripper, 20% of the stripper should be replaced with fresh material.

Rinsing

After removing the adhesive, a step-wise, warm-rinsing process is recommended. Rinse in a dilute, non-ionic surfactant or liquid detergent system, followed by a final rinse in de-ionized water to eliminate water spots due to hard salts and contaminant redeposition.

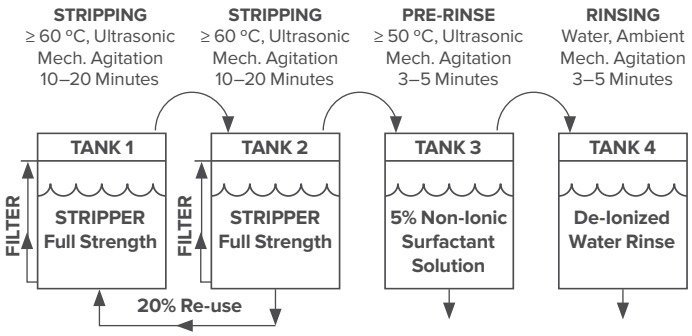
Compatibility

Strippers are non-ionic and non-reactive with metals, however, they will attack many types of polymers and plastics such as elastomers and rubbers. Contact Aremco with any questions about compatibility.

Handling and Storage

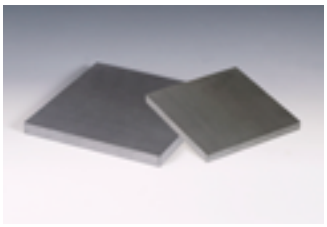
Crystalbond™ strippers are readily biodegradable and non-toxic to marine life. The use of gloves and eye goggles is recommended. Respiratory protection or ventilation is recommended under normal handling. When heated, vapors should be ventilated from work space. Keep container tightly closed and store in a cool, dry, well-ventilated area or cabinet. Isolate from incompatibles such as corrosives, oxidizers, or strong reducing agents.

Suggested Process Diagram For Cleaning



MACHINING ACCESSORIES

Ceramic Mounting Blocks



Aremcolox™ 502-1100 Alumino-Silicate, unfired machinable ceramic is an ideal mounting block for substrates. This ceramic provides a rigid mounting surface and is excellent for dressing the diamond wheel as thru-cuts are made. The ceramic's surface can be re-faced to keep operating costs to a minimum. Standard ground, flat and parallel plates are available, ½″ × 4″ × 4″ and ½″ × 6″ × 6″. Custom sizes are available upon request.

Diamond Wheels

Aremco offers a complete range of metal- and resin-bonded diamond wheels, custom mounting flanges and dressing sticks.

120-Series, Metal-Bonded

Sintered, impregnated wheels consisting of a uniform distribution of diamond in a metal matrix metallurgically bonded to the wheel periphery. Wheels to 20 mils thick.

OD	ID	Thickness
2″	⅝″	.004–.010″
2 3⁄16″	⅝″	.006–.012″
2¼″	⅝″	.006–.012″
2½″	⅝″	.006–.012″
2¾″	⅝″	.006–.012″
3″	⅝″	.006–.012″
3¾″	⅝″	.009–.015″
4″	⅝″	.010–.016″
5″	⅝″	.015–.020″

126-Series, Resin-Bonded

Phenolic-based wheels consisting of a diamond matrix distributed throughout the entire surface area of the wheel. The phenolic wears away, continuously exposing new diamond. Wheels to 20 mils thick.

OD	ID	Thickness
3″	1.575″	.003–.020″
4″	2.75″	.003–.020″
4½″	2.75″	.003–.020″

Cutting Lubricant

Aremco-Cool™ 558 is a translucent, water-soluble concentrate which provides exceptional lubricity and wetting of extremely abrasive materials. It improves machinability, reduces tool wear, and will not cause corrosion or buildup when diluted with clean water. Aremco-Cool™ is biodegradable, odorless and environmentally-safe to operators. A ratio of 32-parts water to 1-part concentrate is typically recommended.

Miniature Diamond Drills

Aremco's miniature diamond drills are used to produce chip-free, high-precision holes in fired ceramics and other ultra-dense materials. Miniature solid drills are offered from 6 to 40 mils in diameter. Miniature core drills are offered with inside diameters from 20 to 500 mils.

Series 107 Solid Diamond Drills

Part Number	Drill Dia.	Drill Pt. Length	Shank Length	Shank Dia.	Part Number	Drill Dia.	Drill Pt. Length	Shank Length	Shank Dia.
107-SD5	0.005″	0.020″	1 1⁄16″	0.040″	107-SD15	0.015″	0.060″	1 3⁄16″	0.040″
107-SD6	0.006″	0.024″	1 1⁄16″	0.040″	107-SD16	0.016″	0.064″	1 3⁄16″	0.040″
107-SD7	0.007″	0.028″	1 1⁄16″	0.040″	107-SD17	0.017″	0.068″	1 3⁄16″	0.040″
107-SD8	0.008″	0.032″	1 1⁄16″	0.040″	107-SD18	0.018″	0.072″	1 3⁄16″	0.040″
107-SD9	0.009″	0.036″	1 1⁄16″	0.040″	107-SD19	0.019″	0.076″	1 3⁄16″	0.040″
107-SD10	0.010″	0.040″	1 1⁄16″	0.040″	107-SD20	0.020″	0.080″	1 3⁄16″	0.040″
107-SD11	0.011″	0.044″	1 3⁄16″	0.040″	107-SD25	0.025″	0.100″	1½″	0.125″
107-SD12	0.012″	0.048″	1 3⁄16″	0.040″	107-SD30	0.030″	0.100″	1½″	0.125″
107-SD13	0.013″	0.052″	1 3⁄16″	0.040″	107-SD35	0.035″	0.100″	1½″	0.125″
107-SD14	0.014″	0.056″	1 3⁄16″	0.040″	107-SD40	0.040″	0.100″	1½″	0.125″

Series 109 Diamond Core Drills

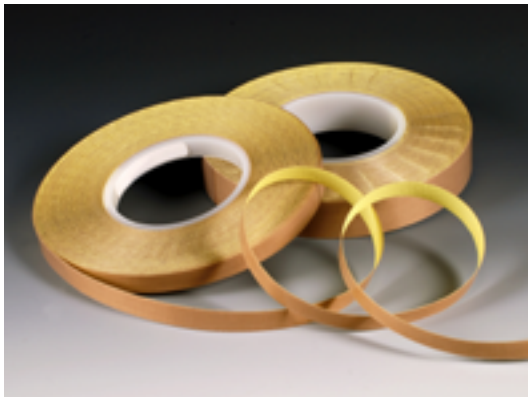
Part Number	Core ID	Core OD	Core Length	Total Length	Part Number	Core ID	Core OD	Core Length	Total Length
109-37	0.020″	0.046″	⅛″	1.00″	109-112	0.112″	0.152″	¼″	1.50″
109-38	0.025″	0.050″	⅛″	1.00″	109-116	0.116″	0.156″	¼″	1.50″
109-39	0.025″	0.055″	⅛″	1.00″	109-120	0.120″	0.160″	¼″	1.50″
109-40	0.040″	0.060″	⅛″	1.00″	109-128	0.128″	0.168″	¼″	1.50″
109-41	0.041″	0.061″	⅛″	1.00″	109-136	0.136″	0.176″	¼″	2.00″
109-42	0.042″	0.062″	⅛″	1.00″	109-140	0.140″	0.180″	¼″	2.00″
109-43	0.043″	0.063″	⅛″	1.00″	109-144	0.144″	0.184″	¼″	2.00″
109-48	0.048″	0.068″	⅛″	1.00″	109-147	0.147″	0.187″	¼″	2.00″
109-52	0.052″	0.072″	⅛″	1.00″	109-149	0.149″	0.189″	¼″	2.00″
109-55	0.055″	0.075″	⅛″	1.00″	109-152	0.152″	0.192″	¼″	2.00″
109-59	0.059″	0.079″	⅛″	1.00″	109-154	0.154″	0.194″	¼″	2.00″
109-63	0.063″	0.083″	⅛″	1.00″	109-157	0.157″	0.197″	¼″	2.00″
109-67	0.067″	0.087″	⅛″	1.00″	109-159	0.159″	0.199″	¼″	2.00″
109-70	0.070″	0.090″	⅛″	1.00″	109-161	0.161″	0.201″	¼″	2.00″
109-73	0.073″	0.093″	⅛″	1.00″	109-166	0.166″	0.206″	¼″	2.00″
109-76	0.076″	0.096″	⅛″	1.00″	109-169	0.169″	0.209″	¼″	2.00″
109-78	0.078″	0.098″	⅛″	1.00″	109-173	0.173″	0.213″	¼″	2.00″
109-81	0.081″	0.101″	⅛″	1.00″	109-177	0.177″	0.217″	¼″	2.00″
109-82	0.082″	0.102″	⅛″	1.00″	109-180	0.180″	0.220″	¼″	2.00″
109-86	0.086″	0.106″	⅛″	1.00″	109-182	0.182″	0.222″	¼″	2.00″
109-89	0.089″	0.109″	⅛″	1.00″	109-185	0.185″	0.225″	¼″	2.00″
109-93	0.093″	0.113″	⅛″	1.00″	109-188	0.188″	0.228″	¼″	2.00″
109-96	0.096″	0.136″	¼″	1.50″	109-203	0.203″	0.243″	¼″	2.00″
109-98	0.098″	0.138″	¼″	1.50″	109-218	0.218″	0.258″	¼″	2.00″
109-99	0.099″	0.139″	¼″	1.50″	109-234	0.234″	0.274″	¼″	2.00″
109-101	0.101″	0.141″	¼″	1.50″	109-250	0.250″	0.290″	¼″	2.00″
109-104	0.104″	0.144″	¼″	1.50″	109-312	0.312″	0.372″	¼″	2.00″
109-106	0.106″	0.146″	¼″	1.50″	109-375	0.375″	0.435″	¼″	2.00″
109-110	0.110″	0.150″	¼″	1.50″	109-437	0.437″	0.497″	¼″	2.00″
109-111	0.111″	0.151″	¼″	1.50″	109-500	0.500″	0.560″	¼″	2.00″

Refer to Price List for complete order information.

Pyro-Tape™ 682 is a family of high temperature, high performance tapes used in a wide range of industrial applications for plasma spray masking, heat reflectivity and abrasion, chemical, and electrical resistance. Pyro-Tape™ products are available in rolls up to 1" wide as well as custom widths and preformed shapes.

PRODUCT	APPLICATIONS	FEATURES
682-CR	Chemical Resistance	• Teflon (DuPont registered) coated fiberglass tape. • Chemical resistance of Teflon for corrosive environments. • Non-stick covering for heat seal bars and rubber molds used in the fabrication of composites.
682-DS	Double Sided	• Assembly of high temp components and films.
682-ER	Electrical Resistance	• Electrical insulation for process instrumentation, wiring and harnesses. • RF induction coil insulation. • Transformer, terminal and connector insulation. • Masking gold fingers for printed circuit board wave soldering.
682-HR	Heat Reflection	• Protective wrap for pipes exposed to high heat. • Heat mask for process instrumentation. • Protective wrap for chutes, rails and slides.
682-PM	Plasma Spray Masking	• Multi-ply construction replaces single-ply tapes permitting significant reduction in masking time. • Shadow mask tape for HVOF (high velocity oxy-fuel) spraying.

Pyro-Tape™ 682-HR Heat Reflective Tape



Pyro-Tape™ 682-CR Chemically Resistant Tape

PYRO-TAPE™ 682 PRODUCT SPECIFICATIONS

Product Number	Tape Description	Total Tape Cross-Section in/mm	Temp[1] °F (°C)	Adhesion Value oz/in	Tape Tensile Strength lbs/in	Volume Resistivity[2] ohm-cm	Dielectric Strength volts/mil	Dielectric Constant
682-CR	Single layer, Teflon-coated fiberglass with high strength silicone adhesive	0.009 / 0.228	–100 / +500 (–73 / +260)	50	120	NA	6,000	NA
682-DS	Double-sided, single layer, fiberglass tape with silicone adhesive	0.007 / 0.018	–100 / +500 (–73 / +260)	25	175	NA	NA	NA
682-ER	Single layer polyimide film with silicone adhesive	0.0025 / 0.063	–100 / +500 (–73 / +260)	20	30	1.5×10^{17}	7,000	3.4
682-HR	Bi-layer aluminum-fiberglass with silicone adhesive	0.077 / 0.177	–100 / +500 (–73 / +260)	40	150	NA	NA	NA
682-PM	Tri-layer silicone rubber-aluminum foil-fiberglass with silicone adhesive	0.019 / 0.480	–100 / +500 (–73 / +260)	40	130	NA	NA	NA

Reference Notes

[1] For plasma spray work, tapes will withstand flash temperatures far in excess of maximum operating temperatures.

[2] Volume resistivity is for film only. No data for film with adhesive backing.

PYRO-TAPE™ 682-TB THERMAL BARRIER CERAMIC TAPE

The new 682-TB tape is a woven silica fabric tape with temperature resistance as high as 2500 °F used to offer thermal insulation for pipes. The Pyro-Tape™ 682-TB has an adhesive backing which is used to ease wrapping around pipes. The adhesive will burn off at 275 °F, and then the tape is secured to the pipe in intervals with stainless steel wire.

Pyro-Tape™ 682-TB Heat Barrier Tape

PRODUCT SPECIFICATIONS

Product	Tape Thickness	Tape Width	Thermal Conductivity[1] BTU-in/hr-ft^2-°F	Silica Content	Roll Length
682-TB1-1	0.030″ / 0.76mm	1″	1.0	> 96%	150′
682-TB1-2	0.030″ / 0.76mm	2″	1.0	> 96%	150′
682-TB1-4	0.030″ / 0.76mm	4″	1.0	> 96%	150′
682-TB2-1	0.054″ / 1.37mm	1″	1.1	> 96%	75′
682-TB2-2	0.054″ / 1.37mm	2″	1.1	> 96%	75′
682-TB2-4	0.054″ / 1.37mm	4″	1.1	> 96%	75′

Reference Notes

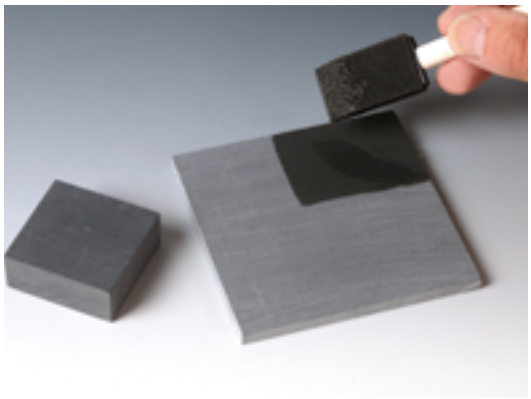
[1] Measured at a average temperature of 600 °F.

AREMCO

HIGH TEMPERATURE INORGANIC BINDERS

Technical Bulletin A11

Aremco's Ceramabind™ materials are unique inorganic, water-based binder systems used in the formulation of specialty adhesives, coatings, sealants and putties for applications to 3200 ºF. The versatility of Aremco's Ceramabind™ products enables users to blend formulations using most ceramic, glass and metal-oxide powders. Specific properties such as coefficient of thermal expansion, thermal conductivity, dielectric strength, and chemical and moisture resistance can be optimized.



Ceramabind™ 542 seals porosity in ceramic plate.

PRODUCT HIGHLIGHTS

542 An acidic, etching solution which is ideal for use in adhesive systems for bonding non-porous ceramics and glass. Stable when mixed with copper. Reacts with bases such as carbonates, oxides and hydroxides of alkali metals.

642 A basic solution which is highly compatible with most ceramic and metal powders. Good wettability and tack, and excellent acid resistance after curing. Extremely moisture resistant after a high temperature cure. Sets up in thick cross-sections when properly formulated.

643-1 A basic solution compatible with most ceramic and metal powders. Excellent binder for producing high temperature protective coatings and refractory and chemically resistant adhesives and patching materials. Fully cures at low temperatures and sets up in thick cross-sections when properly formulated.

643-2 Similar to 643-1. Excellent for formulating thin coatings that set at room temperature and can be raised rapidly to high temperatures.

644-A An acidic, colloidal alumina binder developed for mixing with sized refractory flours and grains to produce high temperature refractory coatings for ceramic fiber boards. Used as a superior standalone system to rigidize refractory fiber shapes.

644-S A colloidal silica aqueous solution which produces high adhesive strength. Ideal for blending with all types of granular and fibrous ceramics. Excellent resistance to temperature, moisture and mechanical shock.

830 A basic solution compatible with most oxide and metal powders. Ideal for formulating high pigment-to-binder ratios to produce dense adhesives and coatings. Sets at room temperature to a moisture resistant film and does not require a heat cure. Use only for thin coating systems less than 1 mil thick.

875 An acidic powdered binder system used to formulate high strength, hydraulic-setting cements for electrical potting or molding applications. A powder blend is typically formulated by adding one part binder to four parts filler by weight. Water is then added in a ratio of 15–20 parts to 100 parts powder blend by weight.

880 High temperature, water-dispersible silicone resin for producing corrosion and moisture resistant coatings and sealing porous ceramics.

TYPICAL PRODUCT SPECIFICATIONS

Product	542	642	642A	643-1	643-2	644-A	644-S	830	875	880
pH	2.5	10.7	10.7	11.0	11.5	4.0	9.0	11.4	2.8	6.5
Specific Gravity, g/cc	1.47	1.41	1.25	1.26	1.27	1.23	1.40	1.20	1.36	1.04
Viscosity, cP	50	370	200	60	30	7	35	10	NA	480
Solids Content, % by weight	40	40	25	30	30	30	40	25	100	50
Temperature Resistance, °F (°C)	3200 (1760)	3000 (1650)	3000 (1650)	3000 (1650)	3000 (1650)	3000 (1650)	3200 (1760)	2000 (1093)	3000 (1650)	1200 (650)

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Rev. 4/15

APPLICATION GUIDELINES

Mixing & Application

1. Liquid binder-to-powder weight ratios of 4:1 to 1:1 are recommended when formulating adhesives, coatings and pastes. Powder binder (875) to filler ratio of 1:4 is recommended.
2. Blend powder slowly into binder until desired viscosity is achieved. Vacuum degas as required to reduce entrapped air.
3. Apply mixture to clean surfaces. Extremely smooth surfaces are difficult to wet and should be sandblasted, etched, or slightly oxidized wherever possible. Porous substrates tend to absorb and separate the binder from the powder; these substrates should be pre-coated with the binder only prior to applying the mixture.

Curing

Ceramabind™ 542

1. Air dry at room temperature for 1–2 hours.
2. Heat cure at 200 °F for 1–2 hours.
3. Heat cure at 500 °F for 1–2 hours.
4. Final cure at 700 °F for 1 hour for maximum adhesive strength and moisture resistance.

Ceramabind™ 642, 642A, 643-1, 643-2

1. Air dry at room temperature for 1–2 hours.
2. Heat cure at 200 °F for 2–4 hours.
3. Heat cure at 350 °F for 1–2 hours.
4. Final cure at 500 °F for 1 hour.

Ceramabind™ 644-A, 644-S

1. Air dry at room temperature for 2–4 hours.
2. No heat cure is required if substrate is ramped slowly at ~200 °F per hour to the operating temperature.

Ceramabind™ 830

1. Air dry at room temperature for 1–2 hours.
2. No heat cure is required.

Ceramabind™ 875

1. Air dry at room temperature for 1–2 hours.
2. Heat cure at 200 °F for 2–4 hours.
3. Final cure at 250 °F for 2–4 hours.
4. Note: This binder can also be set at room temperature in 16–24 hours without heat curing.

Ceramabind™ 880

1. Air dry at room temperature for 1–2 hours.
2. Final cure at 450 °F for 1 hour or 480 °F for 45 minutes.

Storage

Unopened containers have a six-month shelf life when stored at room temperature. Make sure opened containers are capped securely to prevent evaporation. Place a plastic film in between the cap and container to prevent air leakage. Store containers between 45 °F and 95 °F.

CERAMABIND™ COMPATIBILITY CHART

Product	542	642 / 642A	643-1 / 643-2	644-S	644-A	830	875	880
Aluminum	R	S	R	S	R	S	R	S
Aluminum Oxide	S	S	S	S	S	S	S	S
Aluminum Nitride	R	S	S	S	S	S	S	S
Boron Nitride	S	S	S	R	S	S	S	S
Brass	S	S	S	S	S	S	R	S
Bronze	S	S	S	S	S	S	R	S
Chromium	R	S	S	S	S	S	R	S
Cobalt	R	S	S	S	S	S	R	S
Copper	S	R	S	S	S	S	R	S
Dolomite	S	S	S	S	S	S	S	S
Inconel	S	S	S	S	S	S	S	S
Indium	S	S	S	S	S	S	R	S
Indium Oxide	S	S	S	S	S	S	R	S
Invar	S	S	S	S	S	S	S	S
Iron	R	S	S	S	S	S	R	S
Iron Oxide	R	S	S	S	S	S	S	S
Magnesium Oxide	R	S	S	R	S	S	R	S
Manganese Dioxide	S	S	S	S	S	S	R	S
Mica	S	S	S	S	S	S	S	S
Molybdenum	R	S	S	S	S	S	S	S
Mullite	S	S	S	S	S	S	S	S
Neodymium Oxide	R	S	S	S	S	S	R	S
Nickel	R	S	S	S	R	S	R	S
Nichrome	S	S	S	S	S	S	R	S
Silicon Dioxide	S	S	S	S	S	S	S	S
Silicon	S	S	S	S	S	S	R	S
Silicon Carbide	R	S	S	R	S	S	S	S
Stainless Steel	R	S	S	R	S	S	S	S
Tantalum	R	S	S	R	S	S	S	S
Titanium	R	S	S	R	S	S	S	S
Titanium Diboride	R	R	R	S	S	S	R	S
Titanium Dioxide	S	S	S	R	S	S	S	S
Zinc	S	S	S	R	S	S	R	S
Zirconium Carbide	R	S	S	S	S	S	S	S
Zirconium Diboride	R	S	S	S	S	S	S	S
Zirconium Oxide	S	S	S	S	S	S	S	S
Zirconium Silicate	S	S	S	S	S	S	S	S

Key
S = Stable R = Reacts

Safety

Read Material Safety Data Sheet carefully prior to use. All Ceramabind™ products are water-based materials which can be washed from the skin, in the uncured state, with mild soap and warm water. Prolonged skin contact should be avoided to prevent irritation. If any material contacts the eyes, flush continuously with water or neutralizing solutions, then consult a physician immediately.

Aremco offers a good selection of mechanical and pneumatic dispensing tools which are tailored for its ceramic and epoxy-based products.

TOOLS FOR ONE-COMPONENT CERAMIC SYSTEMS

Syringe and cartridge-style systems can be used with Aremco's ceramic and ceramic metallic high-temperature systems.

Two standard 30cc syringes are offered, one for manual use, the other for use with a mechanical dispense gun.

A standard 6 oz. (173cc) high density polyethylene cartridge with ¼ NPT female threads is also offered. Manual and pneumatic hand guns, and plastic and stainless steel needles are also provided.

All metal and plastic components are easily reused since Aremco's ceramic and ceramic-metallic products are all water-based systems.

Syringe Options

8000 30cc Manual Syringe with Plunger and Tip Cap
8100 Squeeze Bottle, 9 oz.

8200 30cc Mechanical Syringe Gun
- 8201 30cc Barrel, Plunger and Tip Cap Kit
- 8202 30cc End Cap

Cartridge Options

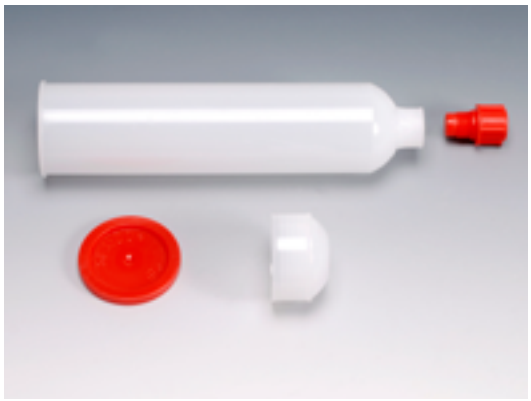
8500 Manual Hand Gun
8510 Pneumatic Hand Gun
- 8515 6 oz. Cartridge
- 8516 Plunger
- 8517 Rear Cap
- 8518 Tip Cap

Plastic Nozzles, ¼ NPT
- 8525 1/16″ Orifice, 4.0″ Long
- 8530 1/8″ Orifice, 4.0″ Long

Stainless Steel Needles, ¼ NPT × 2.5″ Long
- 8535 8 Gauge (0.128″)
- 8540 10 Gauge (0.102″)
- 8545 12 Gauge (0.081″)
- 8550 14 Gauge (0.064″)

8200 30cc Dispense Gun

8500 6 oz. Dispense Gun



851X 6 oz. Cartridge, Plunger, End Cap & Tip Cap

8535, 8540, 8545, 8550 Stainless Steel Needles

992X Nozzle Adapter and Needles

TOOLS FOR TWO-COMPONENT EPOXY SYSTEMS

A standard 50ml dual barrel cartridge is offered for Aremco's High Performance 1:1 Epoxy Systems. Most 1:1 products described in Technical Bulletins A7 and A8 are offered in pre-packaged 50ml cartridges. Part numbers for dispense guns, nozzles and needles are provided below.

9700	Mechanical Dispense Gun
9850	Hand-Held Plunger
9900	Un-Filled Dual Barrel Cartridge (25ml/barrel) Including (2) Pistons and Tip Cap
9905	Static Mixing Nozzle, 3.5″
9910	Static Mixing Nozzle, 6.0″
9920	Mixer-Needle Adapter
9921	Needle, .063″ ID × ½″ L
9922	Needle, .047″ ID × ½″ L
9923	Needle, .033″ ID × ½″ L
9924	Needle, .023″ ID × ½″ L
9925	Needle, .016″ ID × ½″ L
9926	Needle, .010″ ID × ½″ L

Larger cartridge sizes including 75ml, 200ml and 400ml are available upon request.

9700 50ml Dispense Gun

MIXER FOR ONE- AND TWO-COMPONENT SYSTEMS

Aremco offers the Model 7000 low-cost, heavy duty, air operated mixer ideal for mixing pint, quart and gallon containers.

PRODUCT HIGHLIGHTS — MODEL 7000

- Easy to Setup
- Heavy Duty Construction
- Compact Design
- Rubber Coated Clamps to Accommodate Pint, Quart & Gallon Containers
- Air Operated
- Rapid Mixing for Adhesives & Coatings (Typically 1–2 Minutes)
- Includes Oiler

Model 7000 Mixer

PRODUCT SPECIFICATIONS — MODEL 7000

Capacity	1.0 Gallon
Air Inlet	¼″ NPT
Air Consumption	1.35 CFM
Air Pressure	90–120 PSI
Speed	1400 Cycles/Minute

AREMCO

ACCU-COAT™ SCREEN PRINTERS

Technical Bulletin E1

Aremco's Accu-Coat™ Screen Printers offer the finest technology for precision screening of electronic components and other materials up to 24". Accu-Coat™ printers represent the best price/performance ratio throughout the industry, providing the most accurate, reliable and cost effective solution for your screen printing needs.

Accu-Coat™ Model 3230-D semi-automatic screen printer with microprocessor based controls and optic alignment system with a maximum 9" x 9" print area.

TYPICAL APPLICATIONS

- Co-Fired Ceramic Packages
- Multilayer Hybrid Circuits
- Liquid Crystal Displays
- SMT Boards
- Piezoelectric Thick Film Devices
- Thick Film Resistors & Capacitors
- Silicon Solar Cells
- Ceramic Brazing
- Instrument Panels
- Flexible Circuits

PRODUCT HIGHLIGHTS

Print Repeatability

Each Accu-Coat™ Screen Printer is based on a high precision two- or four-post die set which positions the print head directly above the part. The print head travels to and from the work in a single axis with a print repeatability of ±.0003", guaranteed over millions of cycles. An additional attribute of this design is that both substrates and tall parts such as ceramic rings and tubes can be accommodated since a clearance of 6"–8" between the print head and stage is provided.

Alignment and Registration

Part-to-screen alignment is accomplished using a precision x-y-theta stage with 2" x-y travel and 360° rotation. The theta adjustment is centered to the stage as opposed to competitive models which pivot the part about a corner requiring multiple x-y adjustments before setup is complete.

A low cost optic alignment system is also offered. With this option, during setup the ink is first printed on a sheet of mylar which is supported by an adjustable metal frame above the substrate. The operator then aligns the fixtured board to the printed pattern on the mylar sheet using the stage controls. A 10x or 20x magnification camera and monitor system is also provided to enhance the image when making critical alignments required for fine-pitch SMT boards or hybrid circuits. Multi-camera and split-monitor alignment systems are also available.

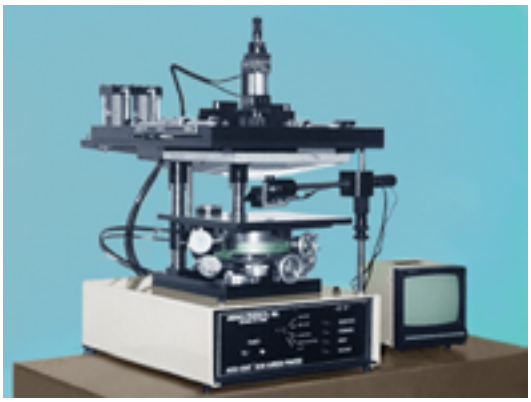
On & Off-Contact Printing

Both screens and stencils can be utilized with the Accu-Coat™ printers. Screens are used for off-contact printing where the squeegee deflects the screen in order to contact the substrate. Stencils are used for on-contact printing in which case the stencil is in direct contact with the substrate. In both on- and off-contact printing, the distance between the screen or stencil and the substrate is controlled easily to within .0005" using a "Z-stop" mechanism.

Controls

Accu-Coat™ screen printers are truly simple machines to operate. The user interfaces with the equipment through an easy-to-use control panel which provides five modes of operation. All modes are pre-programmed into a microprocessor. Modes include setup, print-flood, flood-print, and single and double print with paste hopover.

Vidalign™ 129-131 Optic Alignment System.



Accu-Coat™ Model 3230-B bench-top screen printer.

When switched to Setup mode, the user can independently control each drive cylinder in order to set snap-off distance, squeegee pressure, print speeds and print limits. These setup controls are described as follows:

Print Head Up-Down This is used to set the snap-off distance.

Squeegee Up-Down This is used to set the squeegee downstop (screen deflection) and squeegee pressure.

Squeegee Forward-Away This is used to set the squeegee travel limits and squeegee speed.

Vacuum On-Off This is used for temporary part hold down.

All automatic modes of operation are software-defined and custom print modes and alternative delays are easily provided. Various options such as a squeegee speed timer, multiprint mode (primarily used for co-fired ceramic via-filling applications) and cycle counter are also available.

Reliability

Accu-Coat™ Screen Printers are extremely rugged tools utilizing reliable industrial components and modern controls. A detailed user manual and diagnostics are provided with every shipment. Most of all, Aremco enjoys a three decade history of screen printer manufacturing and over 1,000 units in the field in Europe, Asia, Middle East, Canada, Austrailia, and throughout the USA.

ACCU-COAT™ SCREEN PRINTER SPECIFICATIONS

Accu-Coat™ Model	3230-BL	3230-B	3230-D	3240	3260
Max Print Area	9″ × 9″	9″ × 9″	9″ × 9″	14″ × 14″	20″ × 20″
Screen Frame ID	12″ × 12″	12″ × 12″	12″ × 12″	16″ × 16″	24″ × 24″
Frame Mounts	13″ × 13″	13″ × 13″	13″ × 13″	17.5″ × 17.5″	26″ × 26″
Max Part Height	6″	6″	6″	8″	8″
Print Repeatability	± 0.0003″	± 0.0003″	± 0.0003″	± 0.0003″	± 0.0003″
Snap-Off	On & Off Contact Printing	On & Off Contact Printing	On & Off Contact Printing	On & Off Contact Printing	On & Off Contact Printing
	Single-Point Micrometer Z-Control with 0.001″ Dial Indicator Readout	Single-Point Micrometer Z-Control with 0.001″ Dial Indicator Readout	Single-Point Micrometer Z-Control with 0.001″ Dial Indicator Readout	Three-Point Micrometer Z-Control with 0.001″ Dial Indicator Readout	Three-Point Micrometer Z-Control with 0.001″ Dial Indicator Readout
Control System	Pneumatic[1]	Microprocessor	Microprocessor	Microprocessor	Microprocessor
Control Modes	Independent Pneumatic Switches for Squeegee Up/Down, Print Head Up/Down & Print Drive In/Out	Setup, Print/Flood, Flood/Print, Single & Double Print with Hopover	Setup, Print/Flood, Flood/Print, Single & Double Print with Hopover	Setup, Print/Flood, Flood/Print, Single & Double Print with Hopover	Setup, Print/Flood, Flood/Print, Single & Double Print with Hopover
Control Options	Not Applicable	Cycle Counter, Squeegee Speed Timer, Multiprint	Cycle Counter, Squeegee Speed Timer, Multiprint	Cycle Counter, Squeegee Speed Timer, Multiprint	Cycle Counter, Squeegee Speed Timer, Multiprint
Squeegee Drive	Hydraulic, Variable Speed Control 0–15 IPS	Hydraulic, Variable Speed Control 0–15 IPS, Optional Electric Drive	Hydraulic, Variable Speed Control 0–15 IPS, Optional Electric Drive	Electric Drive, Variable Speed Control 0–12 IPS	Electric Drive, Variable Speed Control 0–12 IPS
Squeegee Type	Free-Floating 9.5″ Squeegee Holder with ⅜″ Square Blade and Flood Bar	Free-Floating 9.5″ Squeegee Holder with ⅜″ Square Blade and Flood Bar	Free-Floating 9.5″ Squeegee Holder with ⅜″ Square Blade and Flood Bar	Free-Floating 14.0″ Squeegee Holder with ⅜″ Square Blade and Flood Bar	Free-Floating 22.5″ Squeegee Holder with ⅜″ Square Blade and Flood Bar
Options	X-Y-Theta Stage, Vacuum Manifolds, Vacuum Pumps, Optic Alignment	X-Y-Theta Stage, Vacuum Manifolds, Vacuum Pumps, Optic Alignment	X-Y-Theta Stage, Vacuum Manifolds, Vacuum Pumps, Optic Alignment	X-Y-Theta Stage, Vacuum Manifolds, Vacuum Pumps, Optic Alignment	X-Y-Theta Stage, Vacuum Manifolds, Vacuum Pumps, Optic Alignment
Dimensions (L × W × H)	32″ × 24″ × 40″	32″ × 24″ × 40″	40″ × 30″ × 64″	40″ × 30″ × 64″	48″ × 38″ × 64″
Approx. Net Weight (lbs)	150	175	325	450	850
Service	No Electricals Required; 80–100 PSI at 5 CFM	110 VAC, 60 Hz, 5A or 220 VAC, 50 Hz, 3A; 80–100 PSI at 5 CFM	110 VAC, 60 Hz, 5A or 220 VAC, 50 Hz, 3A; 80–100 PSI at 5 CFM	110 VAC, 60 Hz, 5A or 220 VAC, 50 Hz, 3A; 80–100 PSI at 5 CFM	110 VAC, 60 Hz, 5A or 220 VAC, 50 Hz, 3A; 80–100 PSI at 5 CFM

Reference Notes

[1] Pneumatic control system can be upgraded to a Microprocessor system if semi-automatic controls are required at a later date.

ECONO-HEAT™ HIGH TEMPERATURE FURNACES

Technical Bulletin E2

Aremco offers a complete line of electric box furnaces from 0.5 to 7.5 cubic feet for applications to 2350 °F. All furnaces are ruggedly constructed and energy efficient, and a wide range of temperature controls are offered for every type of use. Custom features and sizes are also available upon request.

Econo-Heat™ 2928-B Furnace. This model has a work area of 13" × 13 ½" × 8 ¾" and is equipped with a single set point analog temperature controller.

PRODUCT HIGHLIGHTS

- All furnaces are built with 3" premium insulating firebrick and 1" fiber board to permit rapid firing.
- Elements are protected in dropped recessed side wall grooves to provide even heating, longer life, and easy replacement.
- Outer shells are constructed using stainless steel to improve the casing resistance to high temperatures.
- Front-loading and top-loading door styles are offered.
- Alternate power requirements for domestic and international use are easily accommodated.
- Replacement elements are available on a just-in-time basis.
- User-friendly programmable controller.

The Econo-Heat™ furnace shown is a custom unit designed for an aerospace manufacturer for use in heat treating. This furnace has a work area of 42" × 42" × 65", and a unique temperature control system consisting of 21 elements each with its own infinite control switch to permit uniform heating of complex shapes.

TYPICAL APPLICATIONS

- Ash Determinations
- Assaying
- Tempering
- Hardening
- Heat Treating
- Glass Annealing
- Melting
- Fusions
- Dry Precipitates
- Curing Plastics
- Thermal Cycling
- Carbon & Sulphur Tests
- Cement Tests
- Glass & Enamel Tests
- Jominy Hardness Tests
- Petroleum Tests
- Powder Metallurgy
- Thermocouple Standardization
- Ceramic Tests
- Ignitions

TEMPERATURE CONTROLLER

All Econo-Heat™ furnaces are built using the Sentry Xpress 4.0 Temperature Controller by Orton. This controller is a 3-button, 4-segment LED controller that provides 5 built-in speed settings (ramp rate) and the capability to store up to 4 programs with a maximum of 8 segments per program. This flexible, user-friendly controller enables quick and easy programming by the operator.

OPTIONS

Econo-Heat™ furnaces can be modified to include useful features such as view ports, entry holes, or gas intake and exhaust fittings. Larger area and ultra-high temperature furnaces are also available. Contact Aremco's sales engineering department to discuss your requirements.

Econo-Heat™ 2931 Top-Loading Furnace. This model has a work area of 17" × 20" × 17" and is capable of 2400 °F operation using single phase service, 240 Volts and 40 Amps.

ECONO-HEAT™ 2900-SERIES FURNACE SPECIFICATIONS

Model No.	Size (W"x D" x H")		Style		Power			Maximum Temp. °F (°C)	Approx. Weight (lbs)	Heating Elements Per Unit
	ID	OD (Approx)	Front Load	Top Load	Volts	Amp	Phase			
2927	8.5 × 9 × 8.75	16.5 × 17 × 21.75	X		120	15	1	2350 (1288)	80	2
2928	13 × 13.5 × 8.75	21 × 21.5 × 21.75	X		240	15	1	2350 (1288)	110	2
2929	22 × 22 × 13.5	30 × 30 × 26.5	X		240	45	1	2350 (1288)	295	3
2930	15 × 18 × 15	29.5 × 29 × 29		X	240	30	1	2350 (1288)	280	4
2931	17 × 17 × 20	31 × 31 × 31		X	240	40	1	2350 (1288)	300	4
2932	21.5 × 21.5 × 24.5	31 × 36 × 35		X	240	45	1	2350 (1288)	410	5

Refer to Price List for complete order information.