

Section 11

High Temperature Sealants and Adhesives

- Silicone Adhesives & Sealant
- Ceramic Adhesives
- Ceramic Metallic Pastes
- High Temperature Corrosion Protection Coatings



Silicone High
Temperature Sealants
and Adhesives
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Silica High Temperature
Stove Gasket Sealants
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Silicone Rubber Adhesive, Sealant High Temperature, Heat & Flame Resistant

FlameShield™ Paste Adhesive / Sealant



US-ABST-HTG-165

- Easy to use 10.3 oz cartridge fits caulking guns.
- Available in larger pail and bucket sizes.
- Fills gaps, seals enclosures, forms gaskets.
- 500°F / 260°C continuous rating.

US-ABST-HT-903

- Easy to use 10.3 oz cartridge fits caulking guns.
- Available in larger pail and bucket sizes.
- Highest Temperature Rating Silicone Adhesive / Sealant at 300°C continuous rating.
- Great for Kiln and exhaust systems.

US-ABST-SRB-201

- Easy to use 10.3 oz cartridge fits caulking guns.
- Available in larger pail and bucket sizes.
- Cures in 60 seconds with hot air gun
- Specialty high temperature adhesive to bond silicone rubbers together – great for complex high temperature silicone rubber fabrics used in covers and protective blanket systems

High Temperature Silica Based Gasket Cement Adhesive / Sealant

FlameShield™ Liquid Gel Adhesive / Sealant



ABST-SGC-2200

- Use for a high-temperature rigid seal.
- Adheres to all porous fibrous gasket materials.
- Can be used to effect repairs of cracks on stoves, stovepipe and masonry.
- Withstands up to 2000°F / 1093°C.
- 2 fluid oz. 59ml. Squeeze tube.
- Use by applying thin film over entire gasket channel or contact surface. Wait until tacky (10 minutes). Apply gasket material firmly into place.
- Elevate to 250°F / 121°C to fully cure

Please Note: These products are custom produced to order in small batches and all sales are final.

DuctSeal™ FDA Kitchen Duct High Temperature Sealant:



This sealant is used to form a bead ahead of the gasket tape in the flange area in order to keep grease from contaminating the tape.

Can be used to 400°F continuous without degradation.

In the event of a fire, the elevated temperatures will decompose the sealant, turning it into a white insulating powder through a process called caramelization.

During the fire, the gasket tape itself will maintain the seal in the flange. The sealant is available in Oxide-Red color.

Available in two sizes:

- 3 oz squeeze tube.
P/N DS-DSP-03-OR
- 10.3 oz caulk gun cartridge.
P/N DS-DSP-10-OR

- UL recognized, USDA P-1 rated and NSF Standard 51 listed
- FDA approved - meets extraction requirements No. 21 CFR177.2600
- TT-S-001543A
- TT-S-00230C
- ASTM C 920
- Meets MIL-A-46106A Type 1 specifications
- VOC: <30g/L
- 24-30 month shelf life from BOD date stamped on packaging
- Stable & flexible from -60°C (-76°F) to 204°C (400°F) with intermittent peaks to 260°C (500°F)
- Not for use on porous surfaces, surfaces that will be painted or for applications with prolonged water emersion

High Temperature Ceramic Adhesives

1560°F / 850°C to 3200°F / 1760°C

These are unique high temperature inorganic ceramic adhesive formulations for bonding and sealing ceramics, metals, quartz, graphite, carbons, textiles and composite materials and structures. High thermal and electrical resistance.

High Temperature Ceramic Adhesives				
Part Number	Filler	Feature	Bonding	Use
UCA-1509-1	Alumina	High Fired Strength	C-C	Dense Ceramics
UCA-1656-1	Alumina	Adhesion to Metal	C-C; C-M	Low CTE Metals, SOFC's
UCA-1707-1	Alumina	Set at Room Temperature. Good Filler	C-C; C-M	Probes, Sensors
UCA-1800-1	Alumina	Ceramic Fiber Reinforced	C-C	Refractory Repair
UCA-2013-1	Alumina	High Adhesion	C-C; C-M; M-M	Textiles, Threadlocking
UCA-2505-1	Alumina	High Strength. Good filler	C-C; C-M	Halogen Lamps
UCA-2505 MB-2	Alumina	High Strength. Good filler	C-C; C-M	Halogen Lamps
UCA-2439-1	Alumina	Fiber reinforced sealer	C-C; C-M	Tundish Nozzles
UCA-2595-1	Aluminum Nitride	High Thermal Conductivity	C-C; C-M	Probes, Sensors
UCA-2004-1	Alumina-Silica	Set at Room Temperature. Good Filler	C-C; C-M	Oxygen Sensors
UCA-2031-1	Alumina-Silica	Set at Room Temperature. Good Filler	C-C; C-	Induction Coils
UCA-2070-1	Boron Nitride	Good Fired Strength	C-C	Boron Nitride
UCA-1653RN-1	Graphite	High Adhesive Strength	Graphite, Carbon	Structures, Molds
UCA-2007-1	Graphite	Ceramic Fiber Reinforced	Graphite, Carbon	Structures, Molds
UCA-1713-2	Magnesium Oxide	Dielectric, High Strength	C-M; M-M	Heaters, Sensors
UCA-1854-1	Silica	Low CTE, Good Strength	C-C; Quartz	Tubes, Vessels, Sensors
UCA-1548-1	Zirconia	Dielectric, Moisture Resistant	C-C; C-M; M-M	Thermocouples
UCA-2055-1	Zirconia	Bonds Plated Metals to Ceramic	C-M	Heaters, Ignitors, Gasketing
UCA-2505-1	Zirconia	Fiber reinforced, sets room temperature	C-C; C-M	Halogen Lamps
UCA-2655-1	Zirconia	Bonds and coats Zirconia, High Strength	C-C	Zirconia, SOFC's
UCA-2670-1	Silicon Carbide	Bonds SiC and Graphite Components	C-C, Graphite	High Vacuum Fixtures

Bonding: C-C is Ceramic-to-Ceramic; C-M is Ceramic-to-Metal; M-M is Metal-to-Metal. Last digit in the part number indicates number of components: 1 is a one part adhesive; 2 is a two part adhesive. Most 1 part adhesives are delivered with a six month shelf life.

* Other sizes generally available are Quart, Gallon and 5 Gallon. For Quart size, price is 1.8 x Pint price. For Gallon size, price is 3.3 x Pint price. Some items incur higher shipping charges in sizes of 1 gallon and above due to classification as hazardous (Not classified as hazardous in smaller sizes).

Easy to use one and two component systems. Most are air dry at ambient temperature for 1-2 hours, followed by a 200°F to 700°F cure.

Please Note: These products are custom produced to order in small batches and all sales are final.

HIGH TEMPERATURE CERAMIC ADHESIVE & PASTE PROPERTIES																				
Product No.	1509	1656	1707	1800	2013	2439	2505M ⁽⁵⁾	2004	2031	2595	2070	1653RN ⁽¹⁾	2007	1713	1854	2670	1548	2055	2505	2655
Trade Name	CerMax	CerMax	CerMax	CerMax	CerMax	CerMax	CerMax	CerMax	CerMax	CerMax	CerMax	CerMax	CerMax	CerMax	CerMax	CerMax	CerMax	CerMax	CerMax	CerMax
Major Constituent	Alumina				Alumina-Silica				Aluminum Nitride (g)		Boron Nitride		Graphite		Magnesium Oxide		Silica		Silicon Carbide	
Maximum Temperature °F (°C)	3000 (1650)	3000 (1650)	3000 (1650)	2500 (1371)	3200 (1760)	3000 (1650)	3000 (1650)	2500 (1371)	2400 (1316)	3000 (1650)	1560 (850) 2700 (1482)	5400 (2985)	2500	3200 (1760)	3000 (1650)	2500 (1371)	3200 (1760)	2500 (1371)	3000 (1650)	3200
	4.0 (7.2)	4.3 (7.7)	4.2 (7.6)	4.2 (7.6)	4.1 (7.4)	4.0 (7.2)	4.0 (7.2)	4.0 (7.2)	4.1 (7.4)	1.5 (2.7)	2.0 (3.6)	4.1 (7.4)	4.2 (7.6)	7.0 (12.6)	33 (59)	2.4 (4.4)	4.1 (7.4)	4.5 (8.1)	4.0 (7.2)	4.0 (7.2)
CTE, in/in/°F x 10 ⁻⁶ (°C)	10 ⁸ (10 ⁸)	10 ⁸ (10 ⁸)	10 ⁸ (10 ⁸)	10 ⁸ (10 ⁸)	10 ⁸ (10 ⁸)	10 ⁸ (10 ⁸)	10 ⁸ (10 ⁸)	10 ⁸ (10 ⁸)	10 ⁸ (10 ⁸)	10 ¹⁵ (10 ¹⁵)	10 ¹⁵ (10 ¹⁵)	NA (NA)	NA (NA)	10 ⁸ (10 ⁸)	10 ⁸ (10 ⁸)	NA	10 ⁸ (10 ⁸)	10 ⁸ (10 ⁸)	10 ⁸ (10 ⁸)	10 ⁸ (10 ⁸)
Volume Resistivity, ohm-cm @ RT (@ 1000 °F)	253 (240)	250 (80)	256 (100)	200 (80)	250 (97)	250 (80)	245 (95)	245 (95)	200 (100)	500 (300)	500 (300)	NA (NA)	NA (NA)	255 (100)	200 (180)	NA	250 (80)	200 (150)	200 (100)	250 (80)
Dielectric Strength, volts per mil @ RT (@ 1000 °F)	5.6	6.7	6.0	8.3	24.0	18.5	8.5	10.6	6.3	8.3	NA	9.5	2.1	21.6	5.2	10.5	8.6	9.0	7.5	8.0
Torque Strength, ft-lbs ⁽²⁾																				
Moisture Resistance ⁽³⁾	Good	Excellent	Excellent	Good	Excellent	Excellent	Good	Excellent	Excellent	Excellent	Good	Excellent	Excellent	Excellent	Excellent	Good	Good	Excellent	Good	Good
Alkali Resistance ⁽⁵⁾	Fair	Good	Good	Good	Excellent	Excellent	Excellent	Excellent	Good	Good	Good	Good	Good	Good	Good	Good	Excellent	Good	Good	Good
Acid Resistance ⁽⁵⁾	Excellent	Good	Excellent	Fair	Good	Good	Good	Good	Good	Good	Good	Good	Good	Fair	Good	Good	Good	Good	Good	Good
Handling	No. Components ⁽¹⁾	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1
	Mix Ratio, powder:liquid	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.5:1	N/A	N/A	N/A	N/A	N/A	N/A
	Viscosity, cP	43,000	62,000	Paste	Paste	84,000	Paste	35,000	Paste	43,000	62,000	Paste	Paste	60,000	34,000	49,000	83,000	75,000	Paste	Paste
	Specific Gravity, gms/cc	2.50	2.07	2.30	2.16	2.24	2.18	2.41	2.09	2.17	2.01	1.40	1.56	1.58	1.50	1.60	2.18	2.24	1.85	2.41
Curing	Air Set, hours	<1	1-4	1-4	2-4	1-4	4	2	1	1-4	1-4	1-4	1-4	1-4	1-4	<1	1-4	2-3	<1	<1
	Heat Cure, °F, hrs	200, 2 500, 2 700, 2	200, 2 500, 2	200, 2	200, 3	200, 2	200, 3 or 24/RT	200, 2	200, 1-5	200, 2	200, 2	265, 4 500, 2 700, 2	200, 2	200, 2	200, 2 500, 2 700, 2	200, 2 500, 2 700, 2	200, 2 500, 2 700, 2	200, 2 500, 2 700, 2	200, 3	200, 2
Color		White	White	White	White	White	White	White	Off White	Gray	White	Black	Black	Beige	Light Gray	Gray	Tan	Tan	Tan	Tan
	Shelf Life, Months	6	6	6	6	6	3	6	6	6	6	6	6	6	6	6	6	6	6	6
Storage, °F	40-90	40-90	40-90	40-90	40-90	40-90	40-90	40-90	40-90	40-90	40-90	40	40-90	40-90	40-90	40-90	40-90	40-90	40-90	40-90

CERAMIC ADHESIVE SELECTOR CHART																						
	MATERIAL	CTE X 10 ⁻⁶ in/in/ °F (°C)	1509	1548	1653RN	1656	1707	1713	1800	1854	2004	2007	2013	2031	2055	2070	2439	2505	2505M	2595	2655	2670
CERAMICS	ALUMINA (96%)	4.4 (7.9)	•	X		X	X	X	•		•		•		X		•		•			
	ALUMINUM NITRIDE	1.5 (2.7)					•			X	X					X	•	X	X	•		
	BERYLLIA (95%)	4.1 (7.4)	•	X		X	X	X					•				X		X			
	BORON CARBIDE	2.6 (4.6)					•			X	•											
	BORON NITRIDE	4.2 (3.8)	•			X							•			•	X		X			
	CERAMIC TEXTILES	—	•										•		X							
	CORDIERITE	1.1 (1.9)								•					X	X	X					
	GLASS (Borosilicate)	1.8 (3.2)	•							•						X	•		•			
	GLASS BONDED MICA	5.8 (10.4)						X								X		X	X	X		
	GRAPHITE	4.3 (7.7)	X	X	•								•									X
	MACOR®	5.2 (9.4)					X	X			X				X		X	X	X			
	MULLITE	3.0 (5.4)	•				X								X			X	X			
	QUARTZ	0.3 (.56)	X				X			•							X		•			
	SAPPHIRE	4.2 (7.6)	•							•		X		•								
	SILICON CARBIDE	2.9 (5.2)	•														X				X	•
	SILICON NITRIDE	1.8 (3.2)								X							X				X	
	STEATITE	4.0 (7.2)	•	X			X	X								X		X	X	X		
	ZIRCONIA				•											•			•			•
	ZIRCONIA SILICATE				•											•			•			•
REFRACTORIES	—					•			•		•		•				•	•	X			
METALS	ALUMINUM	15.0 (27.0)						•							X			X				
	BRASS	10.2 (18.4)						•							•	X			X			
	CAST IRON	5.9 (10.6)		X		X	X	•					•		X							
	COPPER	9.3 (16.7)						•														
	INCONEL	6.4 (11.5)		X		X	•	X														
	MOLYBDENUM	2.9 (5.2)		X		X	•			X										X		
	NICKEL	7.2 (12.9)		X		X	X	•			X					X		X		X		
	NICKEL-IRON	2.6 (4.7)		X		•	X	X			X						X		X			
	PLATINUM	4.9 (8.8)	X														X					
	SILICON	1.6 (2.9)	X	•		X	X										X					
	SILVER	10.6 (19.1)						•														
	S/S (300 SERIES)	9.6 (17.3)		X		X	X	•			X		•		X		X					
	S/S (400 SERIES)	6.2 (16.6)						•					•		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				
	TITANIUM	5.8 (10.4)					X	•			X											
TUNGSTEN	2.5 (4.5)		X		X	•			X	X						X	X			X		
• Preferred Product For This Application X Applicable Product For This Application																						

UCA High Temperature Ceramic Adhesives

Design Guidelines

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

Coefficient of Thermal Expansion

Due to the thermal shock implicit in most ceramic adhesives 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 ceramic adhesive in tension, since the metal expands faster than the ceramic. The "good" design allows for this thermal mismatch and loads the adhesive in compression, offering higher reliability.

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, and greater than 8 mils will often result in cohesive shear failure within the adhesive.

Operating Environment

Ceramic adhesives offer excellent electrical, thermal and chemical resistance. In addition, ceramic adhesives, in contrast to organic based materials, will not outgas under high vacuum. All operating conditions such as temperature, thermal cycling, humidity, corrosion and electrical requirements should be considered before selecting a ceramic adhesive.

Joint Design

Since ceramic adhesives exhibit relatively poor tensile and shear strength, it is desirable to design a joint that will distribute the mechanical stress. A glue line with greater surface area, such as a tongue-and-groove joint, should be used to reduce joint stress and increase mechanical strength.

Ceramic Adhesive Limitations

Ceramic adhesives are somewhat brittle and may be affected by dynamic conditions such as vibration and mechanical shock. Expansion joints can be used to relieve stress. Adding ceramic cloth at the interface is also useful.

High Vacuum Applications

Ceramic adhesives can be used under high vacuum conditions without outgassing. However, vacuum seals are difficult to produce unless the adhesive joint is sealed with a glass or glasslike coating. Refer to Technical Bulletin ABTG-A5 for glass sealants; refer to Technical Bulletin ABTG-A11 for high temperature inorganic binders.

Application Procedures

Follow the guidelines below for applying high temperature adhesives. Make sure to read specific application instructions on container before use.

Surface Preparation

Clean surfaces thoroughly prior to application. Extremely smooth surfaces are difficult to bond and should be roughened whenever possible. Porous substrates tend to absorb the adhesive binders and should be pre-coated with an adhesive thinner. Product thinners are designated by adding a "-T" to the part number (eg. 1509-T).

Mixing

High temperature adhesives tend to settle in the container and should be mixed thoroughly and slowly to avoid air entrapment. Reduce viscosity as desired using the appropriate product thinner by up to 15% by weight. Two-component systems should be mixed according to the label instructions.

Application

Apply adhesive to each surface in a thin coat using a brush, spatula or dispenser. Wet the surface thoroughly to ensure good adhesion. Maintain a uniform glue line thickness of 2-8 mils. Apply even pressure (clamp if possible), and wipe away excess material before drying. A graded adhesive joint is recommended when bonding components which have a gross difference in coefficient of thermal expansion (CTE). First coat each substrate with the adhesive that best matches its CTE, then use a third adhesive with an intermediate CTE to bond the parts together.

Example: Bond nickel to silica by pre-coating the nickel with 1713 and the silica with 1854.

Allow each substrate to air dry and cure at 200 °F for 1-2 hours. Apply 1656 as an intermediate adhesive and follow standard instructions in the Curing section. When it is necessary to use an adhesive alternatively as a coating, and several applications are required, allow the substrate to air dry for 1-2 hours before applying a second coat. A 200 °F cure for 1-2 hours is recommended for each successive coat to avoid blistering.

Curing

In general all products should be air set for 1-4 hours, then heat cured at 200 °F (93 °C) for 1-4 hours minimum.

1509, 1548, 1854, 2070, 2655, and 2670 will not dry at room temperature and should be step cured at 200 °F (93 °C), 500 °F (260 °C), and 700 °F (372 °C) for 1-2 hours at each temperature. 1653-RN must be cured at 265° F (130 °C) for 4 hours and 500 °F (260°C) for 2 hours to develop maximum strength. Blistering may occur if the glue line is too thick or heating too rapid. Refer to specific product labels for detailed instructions.

Safety

Read Material Safety Data Sheet carefully before use. All products except 1653 can be washed from the skin 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.

High Temperature Ceramic-Metallic Adhesive Paste

950°F / 510°C to 2300°F / 1260°C

These ceramic-metallic adhesive pastes are used to seal joints and repair metal defects in cast aluminum, cast iron, steel and stainless steel.

Resists temperatures to 2300F; used resurface and repair metal defects, reduces scrap, is machinable, strength increases with temperature, easily painted or powder coated, easy and safe to use.

High Temperature Ceramic-Metallic Pastes						
Part Number	UCMP-1959	UCMP-2850	UCMP-3000	UCMP-4500	UCMP-7200	UCMP-7500
Type	Inorganic	Organic	Inorganic	Inorganic	Inorganic	Inorganic
Filler	Stainless	Ceramic Fiber	Aluminum	Ceramic	Stainless	Iron Oxide
Max Temp F/C	2000 / 1093	950 / 510	1400 / 760	2300 / 1260	2000 / 1093	1600 / 871
Specific Gravity	1.9	1.09	1.8	1.27	1.50	2.90
Consistency	Paste	Paste	Paste	Paste	Paste	Paste
Components	1	1	2	1	1	1
Mix Ratio	N / A	N / A	2:1	N / A	N / A	N / A
Air Set, hours	2-4	N / A	2-4	1-2	2-4	2-4
Heat Cure, temp/hrs	200 / 3	400 / 1 or 225 / 6	160 / 1-2	200 / 1	200 / 2-4	200 / 3
Color	Gray	Silver Gray	Light Gray	Gray-Brown	Dark Gray	Black
Shelf Life, months	6	6	6	6	6	6
Storage, F	40-90	40-90	40-90	40-90	40-90	40-90
Packaging Price (Pt)	Pt, Qt, Gal, 5 Gal	11oz cartridge	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal 11oz cartridge	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal

UCMP-1959. For vertical surfaces and applications to ½" thick. Repairs cast iron, steel and stainless steel parts to 2000F.

UCMP-2850 Sealing High Temperature Flanges, Joints to 950F, 750 psi. Cures into a tough pliable inert material.

UCMP-3000 For applications to ½" thick. Repairs cast aluminum parts to 1400F.

UCMP-4500 PriAprily used to seal boiler doors and molten metal systems. Easy to apply and removable. Use up to 2300F.

UCMP-7200 For applications to 3/8" thick. Repairs cast iron, steel and stainless parts to 2000F.

UCMP-7500 For applications to ¼" thick. Repairs cast iron and steel parts to 1600F.

Applications: Afterburners, Boilers, Castings, Exhaust Stacks, Flanges, Furnaces, Headers, Incinerators, Manifolds, Molds and Dies, Ovens, Heat Exchangers, Pumps, Blowers, Piping, Ducting, Turbines.

Please Note: These products are custom produced to order in small batches and all sales are final.

UCMP Ceramic Metallic Paste 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. 1959-T). The mix ratio for UCMP-3000 is 2.0 parts powder to 1.0-1.5 parts liquid by weight. This ratio will produce the consistency of a thick paste. UCMP-3000 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

UCMP products may be applied using a spatula, putty knife or caulk gun. For cross-sections greater than 1/8" - 1/4" multiple applications should be made to avoid blistering. Cross-sections for all products should not exceed 1/2" - 3/4" (3/8" maximum for UCMP-7200).

Curing

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

UCMP-1959:

- 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.

UCMP-2850:

- 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.

UCMP-3000:

- 1) A heat cure is not required for cross-sections less than 1/8" 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 1/8" 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.

UCMP-4500:

- 1) This product dries at room temperature and cures in service at the operating temperature of the equipment.

UCMP-7200:

- 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.

UCMP-7500:

- 1) Air dry at room temperature for a minimum of 1 hour, longer for thick cross-sections.
- 2) Heat cure at 200 °F for 2 hours or air dry at room temperature for 16 hours prior to use.

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.

High Temperature Corrosion Protection Coatings

300°F / 150°C to 1500°F / 816°C

These corrosion protection coatings are based on a number of base compound groups:

Urethane / Epoxy / Inorganic Ceramic with various fillers / Silicone / Silicone-Polyester / Inorganic Ceramic-Zinc

Urethane / Epoxy

High Temperature Urethane / Epoxy Corrosion Protection Coatings						
Part Number	UCCPC-6000	UCCPC-6030	UCCPC-6060	UCCPC-6150	UCCPC-6180	UCCPC-6210
Type	Urethane	Urethane	Urethane	Epoxy-Phenolic	Decolac-Epoxy	Decolac-Epoxy
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
Max Temp F/C	400 / 204	400 / 204	400 / 204	400 / 204	500 / 260	300 / 150 ²
Specific Gravity	1.05	1.08	1.08	1.6	1.9	1.1
Mixed Viscosity, cP	200-240	300-600	200-500	Paste	Paste	800-1000
Thinner	Hi flash Naptha	Hi flash Naptha	Hi flash Naptha	NR	NR	Xylene
Components	1	1	1	2	2	2
Mix Ratio, by wt	N / A	N / A	N / A	1:1	100:8	100:42
WFT, mils (microns)	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)	2.0 (50.8)	2.6 (67.1)	3.1 (78.7)	50+ (1270.0)	50+ (1270.0)	7.0 (177.8)
Dry Film Coverage, @ 1mil, ft ² /gal, m ² /litre	722 (17.7)	1058 (25.9)	1235 (30.3)	1604 (39.3)	1604 (39.3)	1604 (39.3)
Application Temp F	50-90	50-90	50-90	50-90	50-90	50-90
Dry to Touch, hrs	4-6	4-6	4-6	6-8	4	5
Dry Handling, hrs	6-8	6-8	6-8	12-14	6-8	8
Recoat hrs (min/max)	3/7	6/12	3/7	4/48	4/8	4/8
Cure, min air set hrs	0.5	1	0.5	2	8	8
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
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
Color	Gloss Black	Aluminum ¹	Gloss Gray ¹	Brown	Gray	Gray
Pot Life, hrs RT	NA	NA	NA	.7	.75 (500 gms)	.35 (200 gms)
Packaging	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal

Shelf Life for all products is 12 months at room temperature

Storage temperature for all products is 40-90 F

Primer for all products is not required

WFT = Wet Film Thickness

DFT = Recommended Dry Film Thickness

Dry Film Coverage numbers are theoretical: actual coverage will vary with material losses in mixing and application.

Please Note: These products are custom produced to order in small batches and all sales are final.

NOTES:

1. Product will discolour above 300°F.
2. Withstands intermittent service temperatures of 350-400 °F if cured for 2 hours at 185°F

Further Technical Notes for Epoxy Coatings:

Product	6150	6180
Hardness, Shore D	86	90
Lap Shear, strength to aluminum, psi		
@25C	2700	2300
@100C	1800	2000
@150C	900	1200
@175C	300	900
Flexural Strength, psi	13400	11500
Compressive Strength, psi	10300	12000
Elongation, %	3	2

Surface Preparation for all products:

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

Abrasive blast to an SSPC-SP5 profile or etch surface using our UCPREP-6000 product. Apply for a maximum of 15 minutes, then rinse with warm water and dry rapidly.

Chemical Resistance Chart					
Chemical	Concentration	6000	6150	6180	6210
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
Jet Fuel		A	A	A	A
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
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

Inorganic Ceramic with various fillers

High Temperature Inorganic Ceramic Corrosion Protection Coatings						
Part Number	UCCPC-9000	UCCPC-9045-AL	UCCPC-9045-BL	UCCPC-9045-GR	UCCPC-9045-SS	UCCPC-9045-WH
Type	Inorganic	Inorganic	Inorganic	Inorganic	Inorganic	Inorganic
Solids by Weight %	53.2	36.8	50.0	44.5	42.3	40.0
Solids by Volume %	28.5	19.3	46.3	16.8	41.4	20.6
Max Temp F/C	1300 (704)	1200 (649)	1500 (816)	1400 (760)	1400 (760)	1500 (816)
Specific Gravity	1.55	1.32	1.54	1.38	1.47	1.37
Mixed Viscosity, cP	600-1200	250-900	600-900	300-700	200-500	600-900
Thinner	9000T	9045AL-T	9045BL-T	9045GR-T	9045SS-T	9045WH-T
Components	1	1	1	1	1	1
Mix Ratio, by wt	N / A	N / A	N / A	N / A	N / A	N / A
WFT, mils (microns)	3.52 (89.3)	5.20 (131.9)	2.16 (54.9)	6.00 (151.6)	2.42 (61.4)	4.87 (123.6)
DFT, mils (microns)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)
Dry Film Coverage, @ 1mil, ft ² /gal, m ² /litre	456 (11.2)	309 (7.6)	742 (18.2)	269 (6.6)	664 (16.3)	330 (8.1)
Application Temp F	50-90	50-90	50-90	50-90	50-90	50-90
Dry to Touch, hrs	1-2	1-2	1-2	1-2	1-2	1-2
Dry Handling, hrs	2-4	2-4	2-4	2-4	2-4	2-4
Recoat hrs (min/max)	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24
Cure, min air set hrs	1	1	1	1	1	1
Cure, F/hrs	200/2 + 500/1	200/2 + 500/1	200/2 + 500/1	RT / 24	RT / 24	RT / 24
Flash Point, F(C)	> 212 (100)	> 212 (100)	> 212 (100)	> 212 (100)	> 212 (100)	> 212 (100)
VOC's, lbs/gal	0	0	0	0	0	0
Color	Light Gray	Aluminum	Black	Gray	Stainless Steel	White
Pot Life, hrs RT	NA	NA	NA	NA	NA	NA
Packaging	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal

Shelf Life for all products is 6 months at room temperature

Storage temperature for all products is 40-85 °F

Primer for all products is not required except for exterior applications in which salt fog or moisture are present.

WFT = Wet Film Thickness

DFT = Recommended Dry Film Thickness

Dry Film Coverage numbers are theoretical: actual coverage will vary with material losses in mixing and application.

Please Note: These products are custom produced to order in small batches and all sales are final.

Silicone Based

High Temperature Silicone Based Corrosion Protection Coatings						
Part Number	UCCPC-12000	UCCPC-12030	UCCPC-12060	UCCPC-12120	UCCPC-12150	UCCPC-12180
Type	Silicone	Silicone	Silicone	Silicone	Silicone	Silicone
Solids by Weight %	51.5	44.2	44.2	44.2	48.5	46.5
Solids by Volume %	38.1	41.6	38.2	46.1	39.5	38.3
Max Temp °F/°C	1100 (593)	1100 (593)	1100 (593)	1100 (593)	1100 (593)	1100 (593)
Specific Gravity	1.32	1.05	1.28	1.27	1.31	1.31
Mixed Viscosity, cP	400-800	200-600	400-800	400-900	500-750	750-950
Thinner	Distilled Water	Distilled Water	Distilled Water	Distilled Water	Distilled Water	Distilled Water
Components	1	1	1	1	1	1
Mix Ratio, by wt	N / A	N / A	N / A	N / A	N / A	N / A
WFT, mils (microns)	2.6 (66.5)	2.4 (61.0)	2.6 (66.4)	2.2 (55.1)	2.5 (64.3)	2.6 (66.3)
DFT, mils (microns)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)
Dry Film Coverage, @ 1mil, ft ² /gal, m ² /litre	611 (14.9)	668 (16.4)	613 (15.1)	740 (18.2)	634 (15.6)	614 (15.1)
Application Temp °F	50-120	50-120	50-120	50-120	50-120	50-120
Dry to Touch, hrs	1-2	1-2	1-2	1-2	1-2	1-2
Dry Handling, hrs	2-4	2-4	2-4	2-4	2-4	2-4
Recoat hrs (min/max)	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24
Cure, min air set hrs	1	1	1	1	1	1
Cure, F/hrs	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
Flash Point, F(C)	> 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
Color	Flat Black	Aluminum	Gray	White	Green	Red
Pot Life, hrs RT	NA	NA	NA	NA	NA	NA
Packaging	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal

Shelf Life for all products is 6 months at room temperature

Storage temperature for all products is 55-85 °F

Primer for all products is not required except for exterior applications in which salt fog or moisture are present.

WFT = Wet Film Thickness

DFT = Recommended Dry Film Thickness

Dry Film Coverage numbers are theoretical: actual coverage will vary with material losses in mixing and application.

Please Note: These products are custom produced to order in small batches and all sales are final.

Silicone Based - Continued

High Temperature Silicone Based Corrosion Protection Coatings					
Part Number	UCCPC-12210	UCCPC-12240	UCCPC-12270	UCCPC-12285	UCCPC-15000
Type	Silicone	Silicone	Silicone	Silicone	Inorganic
Solids by Weight %	44.8	47.0	44.5	44.5	76.7
Solids by Volume %	38.5	38.0	37.8	37.8	36.8
Max Temp °F/°C	1100 (593)	1100 (593)	1100 (593)	1100 (593)	900 (482)
Specific Gravity	1.25	1.33	1.32	1.32	3.27
Mixed Viscosity, cP	300-600	500-700	300-500	500-700	1250-1750
Thinner	Distilled Water	Distilled Water	Distilled Water	Distilled Water	Distilled Water
Components	1	1	1	1	2
Mix Ratio, by wt	N / A	N / A	N / A	N / A	2:1
WFT, mils (microns)	2.6 (66.3)	2.6 (66.8)	2.7 (67.2)	2.6 (64.9)	2.7 (69.1)
DFT, mils (microns)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)
Dry Film Coverage, @ 1mil, ft ² /gal, m ² /litre	617 (15.2)	610 (15.0)	606 (14.9)	628 (15.4)	589 (14.5)
Application Temp °F	50-120	50-120	50-120	50-120	50-90
Dry to Touch, hrs	1-2	1-2	1-2	1-2	1-2
Dry Handling, hrs	2-4	2-4	2-4	2-4	2-4
Recoat hrs (min/max)	1 / 24	1 / 24	1 / 24	1 / 24	4 / 24
Cure, min air set hrs	1	1	1	1	1
Cure, F/hrs	450/1 or 480/.75	450/1 or 480/.75	450/1 or 480/.75	450/1 or 480/.75	200/2
Flash Point, F(C)	> 212 (100)	> 212 (100)	> 212 (100)	> 212 (100)	N/A
VOC's, lbs/gal	1.01	0.95	0.98	0.98	0.00
Color	Blue	Yellow	Brown	Orange	Zinc
Pot Life, hrs RT	NA	NA	NA	NA	<24
Packaging	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal

Shelf Life for all products is 6 months at room temperature

Storage temperature for all products is 55-85 °F

Primer for all products is not required except for exterior applications in which salt fog or moisture are present.

WFT = Wet Film Thickness

DFT = Recommended Dry Film Thickness

Dry Film Coverage numbers are theoretical: actual coverage will vary with material losses in mixing and application.

Please Note: These products are custom produced to order in small batches and all sales are final.

Silicone-Polyester Based

High Temperature Silicone Polyester Based Corrosion Protection Coatings					
Part Number	UCCPC-12000-S	UCCPC-12030-S	UCCPC-12060-S	UCCPC-12120-S	UCCPC-12150-S
Type	Silicone-Polyester	Silicone-Polyester	Silicone-Polyester	Silicone-Polyester	Silicone-Polyester
Solids by Weight %	69.9	37.0	62.1	42.1	62.1
Solids by Volume %	57.7	36.7	58.5	49.2	57.4
Max Cont Temp °F/°C	600 (316)	600 (316)	600 (316)	600 (316)	600 (316)
Max Int Temp °F/°C	800 (427)	800 (427)	800 (427)	800 (427)	800 (427)
Specific Gravity	1.45	1.00	1.42	1.37	1.46
Mixed Viscosity, cP	400-600	300-400	200-400	300-500	250-350
Thinner	PM Acetate	PM Acetate	PM Acetate	PM Acetate	PM Acetate
Components	1	1	1	1	1
Mix Ratio, by wt	N / A	N / A	N / A	N / A	N / A
WFT, mils (microns)	1.73 (44.0)	2.73 (69.2)	1.71 (43.4)	2.03 (51.6)	1.74 (44.3)
DFT, mils (microns)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)
Dry Film Coverage, @ 1mil, ft ² /gal, m ² /litre	925 (22.7)	589 (14.5)	938 (23.0)	789 (19.4)	920 (22.6)
Application Temp °F	50-120	50-120	50-120	50-120	50-120
Dry to Touch, hrs	1-2	1-2	1-2	1-2	1-2
Dry Handling, hrs	2-4	2-4	2-4	2-4	2-4
Recoat hrs (min/max)	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24
Min air set hrs	1	1	1	1	1
Cure, F/hrs	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
Flash Point, F(C)	118 (48)	115 (46)	115 (46)	115 (46)	115 (46)
VOC's, lbs/gal	3.6	5.3	3.6	3.4	3.7
Color	Black	Aluminum	Gray	White	Green
Pot Life, hrs RT	NA	NA	NA	NA	<24
Packaging	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal

Shelf Life for all products is 6 months at room temperature

Storage temperature for all products is 40-90 °F

Primer for all products is not required except for exterior applications in which salt fog or moisture are present.

WFT = Wet Film Thickness

DFT = Recommended Dry Film Thickness

Dry Film Coverage numbers are theoretical: actual coverage will vary with material losses in mixing and application.

Please Note: These products are custom produced to order in small batches and all sales are final.

Silicone-Polyester Based - Continued

High Temperature Silicone Polyester Based Corrosion Protection Coatings					
Part Number	UCCPC- 12180-S	UCCPC- 12210-S	UCCPC- 12240-S	UCCPC- 12270-S	UCCPC- 12285-S
Type	Silicone-Polyester	Silicone-Polyester	Silicone-Polyester	Silicone-Polyester	Silicone-Polyester
Solids by Weight %	62.1	62.1	62.1	62.1	62.1
Solids by Volume %	57.4	59.0	57.7	58.6	58.9
Max Cont Temp °F/°C	600 (316)	600 (316)	600 (316)	600 (316)	600 (316)
Max Int Temp °F/°C	800 (427)	800 (427)	800 (427)	800 (427)	800 (427)
Specific Gravity	1.47	1.43	1.40	1.45	1.40
Mixed Viscosity, cP	500-700	150-250	300-500	400-600	550-750
Thinner	PM Acetate	PM Acetate	PM Acetate	PM Acetate	PM Acetate
Components	1	1	1	1	1
Mix Ratio, by wt	N / A	N / A	N / A	N / A	N / A
WFT, mils (microns)	1.74 (44.3)	1.69 (43.0)	1.73 (44.0)	1.71 (43.3)	1.70 (43.2)
DFT, mils (microns)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)
Dry Film Coverage, @ 1mil, ft ² /gal, m ² /litre	921 (22.6)	946 (23.2)	925 (22.7)	940 (23.1)	944 (23.2)
Application Temp °F	50-120	50-120	50-120	50-120	50-120
Dry to Touch, hrs	1-2	1-2	1-2	1-2	1-2
Dry Handling, hrs	2-4	2-4	2-4	2-4	2-4
Recoat hrs (min/max)	1 / 24	1 / 24	1 / 24	1 / 24	1 / 24
Min air set hrs	1	1	1	1	1
Cure, F/hrs	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
Flash Point, F(C)	115 (46)	115 (46)	115 (46)	115 (46)	115 (46)
VOC's, lbs/gal	3.7	3.6	3.7	3.6	3.6
Color	Red	Blue	Yellow	Brown	Orange
Pot Life, hrs RT	NA	NA	NA	NA	NA
Packaging	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal	Pt, Qt, Gal, 5 Gal
Price (Pt)					

Shelf Life for all products is 6 months at room temperature

Storage temperature for all products is 40-90 °F

Primer for all products is not required except for exterior applications in which salt fog or moisture are present.

WFT = Wet Film Thickness

DFT = Recommended Dry Film Thickness

Dry Film Coverage numbers are theoretical: actual coverage will vary with material losses in mixing and application.

Please Note: These products are custom produced to order in small batches and all sales are final.

High Temperature Silicone-Ceramic Adhesive & Potting Compound 900°F / 482°C

FlameShield™ UC-2715 Adhesive Potting Compound



- Silicone Bonded – Ceramic Filled.
- Useable to 900°F / 482°C.
- Excellent Moisture Resistance.
- Used to seal and pot electronic components such as power resistors and cartridge heaters.
- Ships as Hazardous.

FlameShield™ UC-2715 Silicone-Ceramic Adhesive & Potting Compound		
Part Number	Quantity	
UC-2715-16	16 oz (Pint)	
UC-2715-32	32 oz (Quart)	
UC-2715-128	128 oz (Gallon)	
UC-2715-640	640 oz (5 Gallon)	

Primary Component:	Fused Silica - Silicone
Max continuous temperature:	900°F / 482°C
Dielectric Strength, volts/mil:	>250
Moisture resistance:	Excellent
Porosity After 900F, %:	<1.0%
Shrinkage, % at 900F:	<1%
Color:	White
No. Of Components:	2
Mix Ratio, powder:liquid:	2.4:1
Mixed Viscosity, cP:	Paste
Recommended Cure:	16-24 Hours @ room temperature +30 min @ 150°-450°F

Please Note: These products are custom produced to order in small batches and all sales are final.

High Temperature, Heat, Flame, Fire, Molten Metal & Weld Splatter Protection Materials

Fax Orders: 610-340-9054 Telephone Orders: 610-906-3549 orders@abthermal.com
