



## HIGH TEMPERATURE REFRACTORY COATINGS

Technical Bulletin A5-S5

Aremco's refractory coatings offer the ultimate protection of high temperature components used in the processing of ceramics, glass, metals, 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 patented coating is a two-part, silica-bonded, titanium diboride filled, oxidation resistant coating for protecting graphite crucibles, electrodes, and heat-treating fixtures to 2000 °F (1093 °C).

#### Pyro-Paint™ 634-AL

This high purity alumina, two-part coating seals alumina fiberboards and shapes to fill porosity and resist molten metals to 3200 °F (1760 °C). Increases heat reflectivity to improve furnace efficiency by reducing ramp up times.

#### Pyro-Paint™ 634-ALP

This phosphate-bonded, single-part alumina coating bonds exceptionally well to dense refractories, providing high abrasion and corrosion resistance for operating temperatures to 3200 °F (1760 °C).

#### Pyro-Paint™ 634-AS and 634-AS1

These alumina-silica, single-part coatings increase the durability of refractory fiberboards by sealing the substrate to minimize dusting and resist wetting by non-ferrous metals to 2300 °F (1260 °C).

#### Pyro-Paint™ 634-BN and 634-BNSC

These lubricious, boron nitride, single-part coatings are used to seal refractory fiberboards and metals from wetting by non-ferrous metals, salts, glasses and plastics. Select 634-BN for hard-coat and 634-BNSC for a more consumable soft-coat.

#### Pyro-Paint™ 634-GR

This single-part graphite coating improves parting of aluminum permanent molds, non-sticking in glass forming, and lubrication and stop-off in metalworking and wire drawing. Provides superior release, surface finish and mold protection.

#### Pyro-Paint™ 634-SIC

This single-part, silicon carbide coating improves the oxidation resistance of graphite crucibles, electrodes, and heat-treating fixtures to 2550 °F (1400 °C).

#### Pyro-Paint™ 634-YO

This single-part, yttrium oxide coating protects graphite, ceramic and metals, exposed to reactive metals such as titanium, uranium and their alloys under inert or vacuum atmospheres to 2732 °F (1500 °C).

#### Pyro-Paint™ 634-ZO

This single-part, zirconium oxide coating produces a hard, oxidation resistant coating on carbon and stainless steel and a range of refractory metals including molybdenum, platinum, rhodium, and titanium to 3270 °F (1800 °C). Good for sealing porous refractories and protecting resistance heating elements from oxidation and residue buildup that 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
<b>Principal Application</b>	Reduce Oxidation of Graphite	Seal Alumina Fiberboard	Seal Dense Refractory	Seal Refractory Fiberboard		Resist Wetting of Non-Ferrous Alloys on Refractories		Resist Wetting of Glass, Metal	Reduce Oxidation of Graphite	Resist Reactive Metals	Prevent Oxidation of Metals
<b>Major Constituent</b>	Titanium DiBoride	Aluminum Oxide		Alumina-Silica		Boron Nitride		Graphite	Silicon Carbide	Yttrium Oxide	Zirconium Oxide
<b>Color</b>	Gray	White	White	Off-White	White	White	White	Black	Gray	Off-White	Off-White
<b>Temperature Limit, °F (°C)</b>	2000 (1093)	3200 (1760)	3200 (1760)	2300 (1260)	2300 (1260)	1560 (850) <sup>1</sup>	1560 (850) <sup>1</sup>	2200 (1200)	2550 (1400)	2732 (1500)	3270 (1800)
<b>No. Components</b>	2	2	1	1	1	1	1	1	1	1	1
<b>Mix Ratio<sup>2</sup></b>	60:40	75:25	NA	NA	NA	NA	NA	NA	NA	NA	NA
<b>Viscosity, cP</b>	200–400	100–200	5,000–7,000	500–800	10,000–20,000	500–1,500	10–100	100–250	750–2,000	200–400	1,000–2,000
<b>Specific Gravity, g/cc</b>	2.15	2.46	2.38	1.55	1.60	1.15	1.20	1.24	2.00	1.55	2.02
<b>Solids by Weight, %</b>	78.7	81.3	76.0	64.3	64.9	19.8	30.0	47.5	68.2	45.0	59.2
<b>Solids by Volume, %</b>	52.7	56.1	53.7	41.1	40.7	18.0	13.3	31.6	42.0	14.0	29.6
<b>WFT, mils (microns)<sup>6</sup></b>	1.9 (48.2)	1.8 (45.3)	1.9 (47.3)	2.4 (61.7)	2.5 (62.4)	5.6 (141.5)	7.5 (190.7)	3.2 (80.5)	2.4 (60.5)	7.1 (180.9)	3.4 (86.0)
<b>DFT, mils (microns)<sup>7</sup></b>	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)
<b>Theoretical Dry Film Coverage @ 1 mil, ft<sup>2</sup>/gal (m<sup>2</sup>/liter)</b>	845 (20.7)	899 (22.1)	861 (21.1)	660 (16.2)	653 (16.0)	288 (7.1)	214 (5.3)	506 (12.4)	674 (16.5)	225 (5.5)	474 (11.6)
<b>Recommended Curing</b>											
<b>Min Air Set, hrs</b>	1	2	1	2	2	2	2	2	1	0.5	2
<b>Hours Cure °F/hrs<sup>3</sup></b>	1400/0.25	200/2	200/2, 800/1	200/2	200/2	200/2	200/2	200/2	200/2, 800/1	200/1	200/2
<b>Application Temperature, °F</b>	50–90	50–90	50–90	50–90	50–90	50–90	50–90	50–90	50–90	50–90	50–90
<b>Thinner<sup>4</sup></b>	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	H <sub>2</sub> O	634-ZO-T
<b>Coating pH</b>	8–9.5	4–5	2–3	8–9.5	8–9.5	11–12	4–5	8–9	2–3	7–8	11–12
<b>Flash Point, °F</b>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<b>Weight/Gallon, lbs<sup>5</sup></b>	12.5	12.0	16.5	12.0	12.5	9.5	10.0	10.0	16.5	12.0	14.5
<b>Shelf Life, months</b>	6	6	6	6	6	6	6	6	6	6	6
<b>Storage Temperature, °F</b>	40–90	40–90	40–90	40–90	40–90	40–90	40–90	40–90	40–90	40–90	40–90

### Reference Notes

<sup>1</sup> Temperature limit applies to oxidizing atmospheres only. Can be used in vacuum/inert atmospheres to 2000 °C.

<sup>2</sup> Mix ratio is Powder : Liquid. Ratios may be altered as required to adjust viscosity.

<sup>3</sup> A short cure is recommended, however, most of these products can be air set then ramped up to operating temperature immediately.

<sup>4</sup> Distilled water may also be used to thin all products. Use 1–2% distilled water by weight.

<sup>5</sup> For two-part systems, this only refers to the weight per gallon for the powder portion of the mixture.

<sup>6</sup> Estimated Wet Film Thickness (WFT).

<sup>7</sup> Recommended Dry Film Thickness (DFT).

### Abbreviations

NA Not Applicable

