



## HIGH TEMPERATURE HIGH EMISSIVITY COATINGS

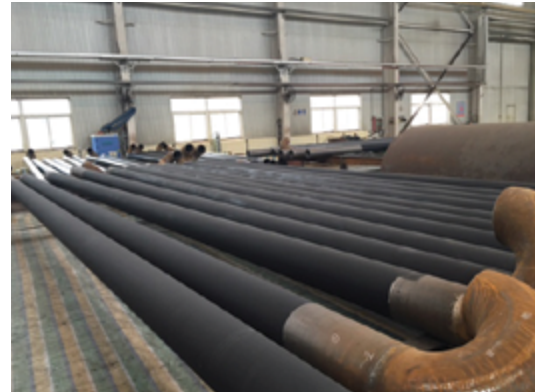
Technical Bulletin A5-S2

### PRODUCT HIGHLIGHTS

Aremco's HiE-Coat™ 840-Series 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, light-weight refractory board, and dense refractories to 2000 °F (1093 °C).
- 840-CX** Ceramic-based, black-pigmented coating for ceramic fiber modules, light-weight refractory board, and dense refractories to 2400 °F (1316 °C).
- 840-CM** Ceramic-based, black-pigmented coating for dense refractories and refractory metals to 2000 °F (1093 °C).
- 840-M** Ceramic-based, black pigmented coating for carbon and stainless steel to 2000 °F (1093 °C).
- 840-MX** Ceramic-based, black pigmented coating for carbon and stainless steel to 2400 °F (1316 °C).
- 840-MS** Silicone-Ceramic, black pigmented coating for aluminum, copper, carbon and stainless steel to 1100 °F (593 °C).

High emissivity coatings absorb and re-radiate significantly more radiant and convective heat than an uncoated burner tube or refractory to a cooler load. For refractories lined systems, this reduces the amount of heat stored in the lining which results in less thermal shock and related thermal stresses, resulting in longer refractory life and reduced maintenance costs. Since less energy is absorbed by the refractory lining, faster heat-ups result, reducing cycle time and energy costs.



HiE-Coat™ 840-M coats gas-fired heating tubes.



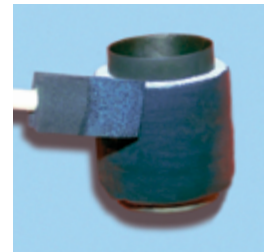
HiE-Coat™ 840-C coats ceramic fiberboard infrared heater.



HiE-Coat™ 840-M coats industrial heat exchanger.



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



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





### HIE-COAT™ HIGH EMISSIVITY COATINGS

Product Number	840-C	840-CX <sup>6</sup>	840-CM	840-M	840-MX <sup>6</sup>	840-MS
Type	Inorganic-Ceramic					Silicone-Ceramic
Applications	Light-Weight Refractory	Light-Weight Refractory	Dense Refractory	Carbon Steel	Carbon Steel	Aluminum
	Fiber Modules	Fiber Modules	Refractory Metals	Stainless Steel	Stainless Steel	Copper
	Dense Refractory	Dense Refractory				Carbon & Stainless Steel
Color (cured)	Jet Black	Jet Black	Jet Black	Jet Black	Jet Black	Jet Black
Maximum Temperature, °F (°C)	2000 (1093)	2400 (1316)	2000 (1093)	2000 (1093)	2400 (1316)	1100 (593)
No. Components	1	1	1	1	1	1
Mix Ratio, by Weight (by Volume)	NA	NA	NA	NA	NA	NA
Viscosity, cP <sup>1</sup>	70–160	50–150	600–800	400–800	300–700	250–500
Specific Gravity, g/cc	1.60	1.52	1.54	1.61	1.57	1.49
Solids by Weight, %	58.5	51.5	48.0	47.3	47.3	57.1
Solids by Volume, %	27.3	20.25	19.9	22.1	22.1	42.5
WFT, mils (microns) <sup>2</sup>	3.66 (92.9)	4.94 (125.4)	5.03 (127.7)	4.52 (114.8)	4.52 (114.8)	2.40 (61.0)
DFT, mils (microns) <sup>3</sup>	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	1.0 (25.4)	1.0 (25.4)	1.00 (25.4)
Theoretical Dry Film Coverage <sup>4</sup> @ 1 mil, ft <sup>2</sup> /gal (m <sup>2</sup> /liter)	438 (10.8)	325 (8.0)	319 (7.8)	355 (8.7)	355 (8.7)	681 (16.7)
Curing, Min Air Set, hrs <sup>5</sup>	1.0–2.0	1.0–2.0	1.0	1.0	1.0	1.0
Curing, Heat Cure, °F, hrs	200, 1	200, 1	200, 0.5 + 500 / 1	200, 1 + 500 / 1	200, 1 + 500 / 1	480 / .75
Application Temperature, °F	50–90	50–90	50–90	50–90	50–90	50–120
Thinner	840-C-T	840-CX-T	840-CM-T	840-M-T	840-MX-T	PM Acetate
Flash Point, °F/°C	NA	NA	NA	NA	NA	~118 (48)
Volatiles, lbs/gal	0.0	0.0	0.0	0.0	0.0	5.3
Shelf Life, months	6	6	6	6	6	6
Storage Temperature, °F	55–85	55–85	55–85	55–85	55–85	40–90

**Reference Notes**

- <sup>1</sup> Viscosity is measured using a Brookfield LV Viscometer; spindle and speed selection vary depending on the product.
- <sup>2</sup> Estimated Wet Film Thickness (WFT).
- <sup>3</sup> Recommended Dry Film Thickness (DFT).
- <sup>4</sup> Actual coverage will vary depending on material losses during mixing and application.
- <sup>5</sup> 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.
- <sup>6</sup> Part numbers ending in "X" are made with black pigment that does not contain any copper; copper can produce "greening" of the coating when exposed to flame impingement.

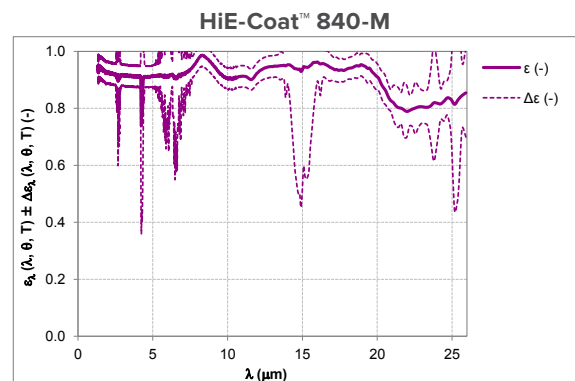
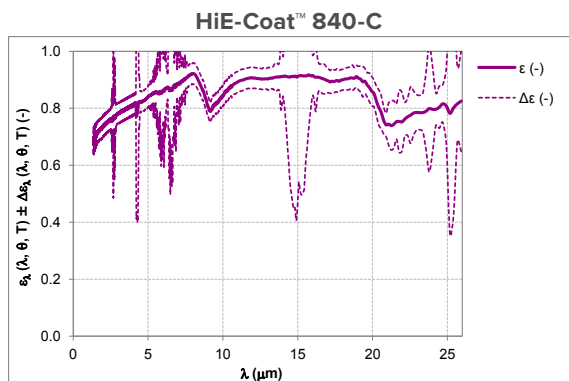
**Surface Preparation Notes**

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

### Spectral Normal Emissivity at 800 °C



λ (μm)	2	3.5	4.7	8.3	10	12.5	17.5	20	25
ε <sub>λ</sub> (λ, θ, T) (-)	0.735	0.799	0.827	0.903	0.848	0.904	0.896	0.860	0.809
Δε (-), k = 2	0.036	0.036	0.036	0.037	0.035	0.036	0.042	0.051	0.066

λ (μm)	2	3.5	4.7	8.3	10	12.5	17.5	20	25
ε <sub>λ</sub> (λ, θ, T) (-)	0.924	0.915	0.911	0.986	0.906	0.943	0.934	0.913	0.832
Δε (-), k = 2	0.038	0.037	0.037	0.039	0.037	0.037	0.041	0.047	0.062

