

### Substrates & Surface Preparation

General	Before applying PYROCRETE 239, the substrate coating must be free of all oil, grease, condensation, or other contamination.
Steel	Steel preparation before priming should be done in accordance with the recommended primers' Product Data Sheet.
Carbon Steel	Carbozinc® 11 Carboguard® 888 Carbozinc® 11 VOC Carbozinc® 11 HS Carboguard® 893 Carboguard® 1340 Rustbond Penetrating Sealer®
Galvanized Steel	Normally not required, but may be required under corrosive conditions. Use Carboline Rustbond Penetrating Sealer.
Non-Ferrous Metals	Aluminum, copper, etc. shall be primed with one coat of Carboline Rustbond Penetrating Sealer.
Concrete	The primer recommended is Carboguard® 1340.

### Lathing & Attachments (Where required)

3.4 lbs./yd<sup>2</sup> (1.85 kg/m<sup>2</sup>) galvanized metal lath, may be pre-bent and tie-wired into place for appropriate design. Optionally, beam furring clips, electrically welded, pneumatic, self-tapping screws or studs, may be used.

**A. Contour Design:** 3.4 galvanized metal lath wrapped around the flange edges toward the web approximately 1½" (3.8 cm). Contour columns allow the use of chicken wire with beam furring clips as an alternate to the 3.4 metal lath. Please refer to design details.

For contour applications on structural members with web span greater than 16" (41 cm) or flange widths greater than 12" (31 cm), refer to the U.L. Fire Resistance Directory under "Coating Materials" section.

**B. Boxed Design:** 3.4 galvanized metal lath wrapped around member spanning the web, overlapped 1" (2.5 cm) and tie-wired on the flange face 12" (31 cm) on center. For large webbed members, additional support for lath may be needed for ease of installation. Optional use of plastic-nose corner beads may be used for better thickness control and aesthetics. See design details.

**C. Tower Skirts and Flat Surfaces:** Require that 3.4 galvanized metal lath be anchored on 12" to 24" (31-61 cm) centers depending upon requirements. The Lath should overlap and be tie-wired. On tower skirts only, PVC coated mesh can be used in lieu of 3.4 galvanized lath. Mesh shall be 2" x 2" 20 gauge wire coated with PVC.

When ram set or welding is prohibited; a pneumatic fastener may be used.

On very large areas control joints are made by scoring halfway through the thickness of PYROCRETE 239. This is achieved by using the trowel blade edge or an appropriate scoring tool. A preferred option would be the use of plastic nosed corner beads. Spacing should be on 10' (3 m) centers, both horizontally and vertically. Please refer to design details.

### Application Equipment

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

General Guidelines:

- Mixer**
1. Use a heavy-duty mortar mixer with rubber tipped blades that scrape the sides and bottom of the mixer. A 50 lb. (20.7kg) bag of PYROCRETE 239 typically requires a mixer volume of 8 ft<sup>3</sup> (.23m<sup>3</sup>) minimum.
  2. Use continuous feed mixer. Contact Carboline technical service for recommendation. Densities may vary when using this type of mixing equipment.

#### Pumps

Mfg.	Model	Type	Size
Essick	FM9, FM5E	Rotor Stator	2L4
Putzmeister	S5EV	Rotor Stator	2L6
Hy-Flex	HZ-30E	Rotor Stator	2L6
Sunspray	EZ88	Rotor Stator	Super 2L6
Strong Mfg.	Spraymate 60	Rotor Stator	2L6
Airtech	Swinger	Piston	N/A
Hy-Flex	H320E	Piston	N/A
Mayco	PF30	Dual Piston	N/A
Thomsen	PTV 700	Dual Piston	N/A

#### Trowels

Standard plasterers' hawk and trowel may be used. A rubber float may also aid in finishing.

#### Compressor

Be certain that the air supply is a minimum 22 cfm at 100 psi (6.9 kPa) and higher when distances longer than 75' (23 m) are required.

#### Material Line

Minimum 1" (2.54 cm) I.D. hose with 300 psi minimum bursting pressure. For lengths over 50' (15 m) use 1½" to 3" (3.8 to 7.6cm) I.D. hose.

Do not reduce hose diameter by more than ¼" (7 mm) per 25' (7.6 m) unless a tapered conical reducer equipped with a swivel fitting is used. A 10' (3 m) length of ¾" I.D. hose may be added at the gun for use as a whip.

#### Air Line

Use ½" (1.27 cm) I.D. line, with a minimum bursting pressure of 100 psi (6.9 kPa).

#### Spray Guns

Mfg.	Model	Fluid Tip	Air Cap
SpeeFlo	701	3/8"-1/2" (9.5-13mm)	3/8"-1/2" (9.5-13mm)
Plasterers	N/A	3/8"-1/2" (9.5-13mm)	N/A
Air Tech	Internal Mix	3/8"-1/2" (9.5-13mm)	N/A

# PYROCRETE®239

## Mixing & Thinning

<b>Mixing</b>	Add 4 ¾-7 gallons (18-26.5 liters) of clean, potable water to a mortar mixer with rubber tipped blades. With mixer running slowly, add powder and mix for 2 minutes minimum until a homogeneous mortar-like consistency is achieved. Total water <i>must not</i> exceed 7 gallons (26.5 liters) per 50 lb. (22.7 kg) bag. In cool weather, warm water may be used to enhance application. In hot weather, cool/cold water may be used.
	For trowel applications mix 5 ± ¼ gallons (19± 1litres) clean potable water per 50 lb (22.7 kg) bag. Wet nozzle density should be 37 lbs./ft <sup>3</sup> (.59 g/cm <sup>3</sup> ).
	For Spray applications mix with 6 ± 1 gallons (23 ± 3.5 litres) of clean potable water per 50 lb. (22.7 kg) bag. See table below.
<b>Pot Life</b>	2 hours at 70°F (21°C) and less at higher temperatures. Pot life ends when the material thickens and becomes unusable.

**Density**  
Wet density measurements are critical to obtaining correct dry densities. Mixer wet density should be 37-44 lbs/ft<sup>3</sup> (.59-.71 g/cm<sup>3</sup>). To check wet densities, fill a Dixie cup (or other suitable container of known volume in ounces) with mixed material. Screed the excess until even with the rim of the container and weigh it on a gram scale. Multiply the weight (in grams) by a conversion factor based on the size of the container. (Conversion factor is calculated by taking 2.107 and dividing by the ounces of the cup used). This will yield density in lbs/ft<sup>3</sup>.

Cup Used	Conversion Factor	Cup Used	Conversion Factor
3 oz.	.702	7 oz.	.301
4 oz.	.527	8 oz.	.263
5 oz.	.421	12 oz.	.175
6 oz.	.351	16 oz.	.132

## Application Procedures

PYROCRETE 239 may be applied by spray and/or trowel. Film build will depend on application method, weather conditions and equipment used. For application overhead, a scratch coat of up to ½" (1.3 cm) is recommended to key into the lath. Allow to set for approximately 1-2 hours at 70°F (21°C) before applying the subsequent coats. It is recommended that the total required thickness be applied within a 24 hour period. If this is not possible, the preceding coats should be left as sprayed or scored after the initial 24 hour period, PYROCRETE 239 should then be dampened with water before application of additional coats.

- Maximum time to achieve the full thickness is 3 days at 70°F (21°C) and 50% RH. This would be less at higher temperatures.
- All additional coats are to be applied monolithically to the entire perimeter of the member.
- At no time shall PYROCRETE 239 be applied at a thickness less than ¼" (7mm) or "skim" coated.

Water Level (per bag)	Spray Wet Density		Dry Density		Coverage (board ft/per bag)
	lbs/ft <sup>3</sup>	(g/cm <sup>3</sup> )	lbs/ft <sup>3</sup>	(g/cm <sup>3</sup> )	
4¾ gallon (18 l)	37	(.59)	28	(.45)	29.1
	40	(.64)	31	(.50)	26.9
	44	(.70)	34	(.55)	24.4
5 gallon (19 l)	37	(.59)	28	(.45)	29.7
	40	(.64)	30	(.48)	27.5
	44	(.70)	33	(.53)	25.0
5½ gallon (20 l)	37	(.59)	27	(.43)	30.4
	40	(.64)	29	(.47)	28.1
	44	(.70)	32	(.51)	25.6
6 gallon (23 l)	41	(.66)	28	(.45)	29.3
	44	(.70)	30	(.48)	27.3
	47	(.75)	32	(.51)	25.5
7 gallon (26.5 l)	44	(.70)	28	(.45)	29.6
	46	(.74)	29	(.47)	28.3
	48	(.77)	30	(.48)	27.1

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## Application Conditions

	Surface or Ambient Temperature		Relative Humidity	
	Minimum	Maximum	Min.	Max.
Interior or Exterior	40°F(4°C)	100°F(38°C)	0%	95%

## Finishing

If a smooth finish is required, this may be done by trowel, roller or brush typically within 1 to 2 hours after final application of PYROCRETE 239.

## Protection of Adjacent Surfaces

Finished surfaces shall be protected from damage and overspray. Encapsulation of aluminum electrical conduits is not recommended.

## Curing Schedule

Fresh PYROCRETE 239 must be protected from rain or running water for 24 hours at 70°F (21 °C). In low humidity, high temperature, direct sun or wind, the PYROCRETE surface should be kept damp for at least 12 hours by applying a water mist or wrapping in plastic sheets to reduce rapid water loss.

**Caution:** Do not start work if ambient temperatures are expected to drop below 35°F (2°C) for 24 hours after application.

## Topcoating

**Seal Coat** – In corrosive environments, use an appropriate topcoat. If topcoating is required, apply Carboguard 1340 as a seal coat. Carboguard 1340 may be applied after 24 hours of final application of PYROCRETE 239. Consult the Carboguard 1340 Product Data Sheet for minimum and maximum cure times.

**Top Coat** – Surface hardness should be a minimum shore D 15 as measured with a Durometer prior to application of the topcoat. Normally, this minimum dry time is 10 days at 70°F (21°C) and 40 days at 40°F (4°C), for thickness of 1" (2.54 cm) or less.

**Caulking** – For exterior installations a compatible caulk should be applied at all termination joints between Pyrocrete 239 and the substrate. Contact Carboline Technical Service for full information.

## Cleanup & Safety

**Cleanup** Pump, mixer and hose should be cleaned with clean, potable water at least once every 4 hours at 70°F (21°C), and more often at higher temperatures. Sponges should be run through the hoses to remove material left in the lines. Wet PYROCRETE 239 overspray must be cleaned up with soapy or clean, potable water. Cured overspray may require chipping and/or scraping to remove.

**Safety**

1. Do not breathe dust. PYROCRETE 239 is caustic and will irritate mucous membranes. Use OSHA approved dust mask while mixing.
2. For eye contact, flush with copious amount of water in accordance with OSHA Instructions. Goggles or safety glasses are always recommended.
3. Wash skin with clean water to prevent irritation.

