

## SELECTION & SPECIFICATION DATA

<b>Generic Type</b>	Medium density, cementitious fireproofing designed to provide fire protection and acoustical noise reduction.
<b>Description</b>	A medium density, Portland cement based, cementitious fireproofing that is mixed with clean, potable water onsite before application and spray applied to the substrate. It provides 1-4 hour fire protection for structural steel members and upgrades the fire resistance of existing concrete. It can also be used as a thermal barrier over polyurethane foam. Recommended areas of application include pharmaceutical facilities, pulp and paper mills, nuclear and conventional power plants, factories, warehouses, stadiums, institutional and biomedical facilities and acoustical applications.
<b>Features</b>	<ul style="list-style-type: none"> <li>• Combined acoustical and fire protection</li> <li>• Easily applied by spray or trowel</li> <li>• Excellent physical properties – hard, durable</li> <li>• Nonflammable – during or after application</li> <li>• Asbestos-free – complies with EPA and OSHA regulations</li> <li>• Chloride and sulfide free – no special priming required</li> <li>• Non-friable – high impact strength</li> <li>• Single package – mixed with clean, potable water at the job site</li> <li>• Investigated for exterior use by Underwriters Laboratories, Inc</li> <li>• Quality Manufactured – under strict Carboline quality standards</li> <li>• UL factory inspection service</li> </ul>
<b>Color</b>	<p>Non-Uniform, Speckled Gray</p> <p>Product color may vary due to variations in color of Portland cement.</p>
<b>Finish</b>	<p>Textured</p> <p>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.</p>
<b>Primer</b>	Pyrocrete 239 neither promotes nor prevents corrosion. The fireproofing should not be considered as part of the corrosion protection system. For applications where primers are required, use a Carboline approved, alkaline resistant primer. Pyrocrete 239 must meet minimum UL bond strength criteria for contour applications where primers are used. Contact the Carboline Fireproofing Technical Service for further information and approved primers.
<b>Application Thickness</b>	1/2-5/8" (12.7-15.9 mm) on initial pass
<b>Limitations</b>	Not recommended for use as a refractory cement or where continuous operating temperatures exceed 200°F (93°C).
<b>Topcoats</b>	<p>Generally not required. In severely corrosive atmospheres, topcoats may be used for added durability and chemical resistance. Consult Carboline Fireproofing Technical Service for selection of the coating most suitable for the operating environment.</p> <p><b>Seal Coat</b> – In corrosive environments, use an appropriate topcoat. If topcoating is required, apply Carboguard 1340 as a seal coat. Carboguard 1340 shall be thinned 25% with Carboline Thinner 2. 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.</p> <p><b>Top Coat</b> – Surface hardness should be a minimum Shore DO 35 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" (25.4 mm) or less.</p> <p><b>Caulking</b> – For exterior installations a compatible caulk should be applied at all termination joints between Pyrocrete 239 and the substrate. Contact Carboline Fireproofing Technical Service for complete instructions.</p>

## SUBSTRATES & SURFACE PREPARATION

<b>General</b>	Before applying Pyrocrete 239, the substrate or coating must be free of all oil, grease, condensation, or other contamination.
<b>Steel</b>	If primer is required, steel preparation before priming should be done in accordance with the recommended primer's product data sheet. Contact Carboline Fireproofing Technical Service for approved primers.
<b>Galvanized Steel</b>	Prior to application, all substrates must be clean and free of loose scale, dirt, oil, grease, condensation, or any other substance that would impair adhesion. For certain designs, mechanical attachment or the application of bonding agents may be required. Contact Carboline Technical Service for further information.
<b>Concrete</b>	The recommended primer to seal concrete prior to applying Pyrocrete 239 is Carboguard 1340.
<b>Non-Ferrous Metals</b>	Aluminum, copper and other non-ferrous metals shall be primed with one coat of Carboline's Rustbond Penetrating Sealer.
<b>Lathing &amp; Attachments</b>	<p>3.4 lb./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 or electrically welded, pneumatic or self-tapping screws or studs, may be used.</p> <p><b>Contour Design</b> - 3.4 lb./yd<sup>2</sup> (1.85 kg/m<sup>2</sup>) galvanized metal lath wrapped around the flange edges toward the web approximately 1½" (38 mm). Contour column designs allow the use of 2" x 2" (50.8 mm x 50.8 mm) galvanized or PVC coated hexagonal metal mesh with beam furring clips as an alternate to the 3.4 lb./yd<sup>2</sup> (1.85 kg/m<sup>2</sup>) galvanized metal lath. Please refer to design details. For contour applications on structural members with web span greater than 16" (406 mm) or flange widths greater than 12" (304 mm), refer to the UL Fire Resistance Directory under "Coating Materials" section.</p> <p><b>Boxed Design</b> - 3.4 lb./yd<sup>2</sup> (1.85 kg/m<sup>2</sup>) galvanized metal lath wrapped around member spanning the web, overlapped 1" (25.4 mm) and tie-wired on the flange face 12" (304 mm) on center. For large webbed members, additional support for lath may be needed for ease of installation. Plastic-nose corner beads may be used for better thickness control and aesthetics.</p> <p><b>Tower Skirts and Flat Surfaces</b> - Require that 3.4 lb./yd<sup>2</sup> (1.85 kg/m<sup>2</sup>) galvanized metal lath be anchored on 12" to 24" (304 mm to 610 mm) 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 lb./yd<sup>2</sup> (1.85 kg/m<sup>2</sup>) galvanized lath. Mesh shall be 2" x 2" (50.8 mm x 50.8 mm) 20 gauge wire coated with PVC as furnished by Carboline.</p> <p>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) center, both horizontally and vertically. Please refer to design details or contact Carboline Fireproofing Technical Service.</p>

## PERFORMANCE DATA

**All test data was generated under laboratory conditions. Field testing results may vary.**

Test Method	Results
ASTM C177 Insulation "K" Factor	0.56 (BTU in / hr ft <sup>2</sup> -°F at 75 °F)
ASTM C423 / E795 Noise Reduction Coefficient (NRC)	0.75 @ 1.0" (25 mm)
	0.65 @ 0.75" (19 mm)
	0.55 @ 0.5" (12.5 mm)
ASTM D2240 Durometer Hardness (Shore DO)	35
ASTM D2794 Impact Resistance	Indents at 20 foot pounds
ASTM D790 Maximum Strain	0.00225 in/in

## PERFORMANCE DATA

All test data was generated under laboratory conditions. Field testing results may vary.

Test Method	Results
ASTM E605 Density <sup>1</sup>	28 lb./ft <sup>3</sup> (448 kg/m <sup>3</sup> ) (minimum average)
ASTM E736 Bond Strength (Unprimed Steel) <sup>2</sup>	4,010 psf (192 kPa) Note: minimum recommended field value is 550 psf (26 kPa)
ASTM E759 Deflection	Pass
ASTM E760 Bond Impact	Pass
ASTM E761 Compressive Strength	105 psi (723 kPa)
ASTM E84 Flame Spread	2
ASTM E84 Smoke Development	2.5
ASTM E859 Air Erosion	0.0215 g/ft <sup>2</sup> @ 24 hours
ASTM E937 Corrosion	0.00 g/mm <sup>2</sup>
ASTM G21 / D3273 Fungi Resistance	Pass
Shrinkage	<0.5%
Specific Heat	0.36 (BTU in / hr ft <sup>2</sup> -°F at 75 °F)

1 Air dry at ambient conditions until constant weight is achieved. Do not force dry.

2 Bond strength testing performed utilizing ASTM E736 with AWC Technical Manual 12-A modifications.

All test data above was generated under laboratory conditions. Field testing results may vary. Physical property data was derived using 4 ½ gallons of water per 50 lb. (22.7 kg) bag.

Test reports and additional data available upon written request.

## MIXING & THINNING

<b>Mixer</b>	Use a heavy-duty mortar mixer rotating at 40 rpm with rubber tipped blades that will scrape the sides and bottom of the mixer. A 50 lb. (22.7 kg) bag of Pyrocrete 239 typically requires a mixer volume of 8 ft <sup>3</sup> (227 L) minimum. <b>Do not use pan type mixers.</b>
<b>Mixing</b>	<b>Target water level:</b> 6 gallons (23 liters) Add clean, potable water to a mortar mixer with rubber tipped blades. With mixer running slowly, add powder and mix for 2 minutes until a homogeneous mortar-like consistency is achieved. Longer mixing times may result in lower densities. Total water must not 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, cold water may be used.
<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.
<b>Density</b>	<b>Target wet density:</b> 37-44 lbs/ft <sup>3</sup> (592.7-704.8 kg/m <sup>3</sup> ). Wet density measurements are critical to obtaining correct dry densities. When checking wet densities, use the following procedures: <b>Equipment needed:</b> <ul style="list-style-type: none"> <li>• 1 liter (1000 cc) polyethylene cup</li> <li>• Small metal spatula</li> <li>• Scale accurate to 1 gram</li> </ul> <b>Determination of Pyrocrete wet density:</b> <ul style="list-style-type: none"> <li>• Weigh the empty cup to the nearest gram, then tare the scale.</li> <li>• Use the spatula to fill the cup completely with mixed material (do not tamp cup).</li> <li>• Remove the excess material on top by placing the vertical edge of the spatula on the top edge of the cup. Use a sawing motion to level the mixed Pyrocrete material flush with the top of the cup.</li> <li>• Weigh the filled cup to the nearest gram.</li> <li>• Record the weight of material in grams. This value equals the wet density in grams/liter and kg/m<sup>3</sup></li> <li>• To calculate the wet density of the material in lb./ft<sup>3</sup>, multiply the value in grams/liter by 0.0624.</li> </ul>

## APPLICATION EQUIPMENT GUIDELINES

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.

<b>Pump</b>	<p>This material can be pumped with a wide range of piston, rotor stator and squeeze pumps designed to pump cement &amp; plaster materials including:</p> <p>Essick - model number FM9/FM5E (Rotor Stator/2L4)  Putzmeister - model number S5EV(Rotor Stator/2L6)  Hy-Flex - model number HZ-30E(Rotor Stator/2L6)  Hy-Flex - model number H320E (Piston)  Strong Mfg. - model number Spraymate 60 (Rotor Stator/2L6)  Airtech - model number Swinger (Piston)  Mayco - model number PF30 (Dual Piston)  Thomsen - model number PTV 700 (Dual Piston)</p>
<b>Trowel</b>	Standard plasterer's hawk and trowel may be used. A rubber float may also aid in finishing.
<b>Material Hose</b>	<p>Minimum 1" (25.4 mm) I.D. hose with 300 psi minimum bursting pressure. For lengths over 50' (15 m) use 1½" (38 mm) I.D. hose. Do not reduce hose diameter by more than ¼" (6.4 mm) per 25' (7.6 m) unless a tapered conical reducer equipped with swivel fitting is used. A 10' (3 m) length of 1" (25.4 mm) I.D. hose may be added at the gun for use as a whip.</p>
<b>Nozzle/Gun</b>	<p>Binks - part number 7E2 (47-49 fluid tip; 3/8-1/2" air cap)  Graco - part number 204000(3/8-1/2" fluid tip; air cap)  Speeflow - part number 701(3/8-1/2" fluid tip; air cap)  Airtech - Internal mix with 3/8-1/2" fluid tip  Standard plasterers gun with 3/8-1/2" fluid tip</p>
<b>Compressor</b>	Be certain that the air supply is a minimum 22 cfm at 100 psi (689 kPa) and higher when distances longer than 75' (22.9 m) are required.
<b>Air Line</b>	Use ½" (12.7 mm) I.D. line, with a minimum bursting pressure of 100 psi (689 kPa).

## APPLICATION PROCEDURES

<b>General</b>	<p>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" (13 mm) is recommended to key into the lath. Allow to set for approximately 1 to 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 application. Product must be dampened with water before application of additional coats.</p> <ul style="list-style-type: none"> <li>• Maximum time to achieve the full thickness is 3 days at 70 °F (21°C) and 50% relative humidity. This would be less at higher temperatures.</li> <li>• All additional coats are applied monolithically to the entire perimeter of the member.</li> <li>• <b>At no time shall Pyrocrete 239 be applied at a thickness less than ¼" (6.4 mm) or "skim" coated.</b></li> </ul>
<b>Finishing</b>	Material can be left as sprayed or finished with a trowel for better aesthetics.

## APPLICATION CONDITIONS

Condition	Material	Surface	Ambient	Humidity
Minimum	40°F (4°C)	40°F (4°C)	40°F (4°C)	0%
Maximum	100°F (38°C)	125°F (52°C)	110°F (43°C)	95%

## CURING SCHEDULE

Surface Temp.	Dry to Recoat
70°F (21°C)	2 Hours

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.

## TESTING / CERTIFICATION / LISTING

<b>Underwriters Laboratories, Inc.</b>	Pyrocrete 239 has been tested by Underwriters Laboratories, Inc. and is classified for exterior or interior use by UL in the following designs: <b>ASTM E119 (UL 263, NFPA 251)</b> Simulates a cellulosic fire exposure <b>Columns</b> - X776, X777, X778, X779, X786, X787, Y707, Y708 <b>Floor Beams</b> – N745, N746, N748, N771, N772, N773, N774, N775, S716, S718 <b>Floor Ceiling Assembly</b> – D744, D767, D768, D769, D770, D771, D772, D773, D774, D775, D776, D777, D927, D928 <b>Roof Assembly</b> – P927, P928, P734, P735, P736, P737, P738, P739, P926, P929 <b>Roof Beams</b> – S731, S732, S733 <b>Walls</b> – U704 <b>Precast Concrete &amp; Steel Joists</b> – G706, G707, G708, J713, J714, J715, J716
<b>City of New York</b>	MEA No. 433-91-M (Columns) MEA No. 434-91-M (Beams) MEA No. 435-91-M (Roof Beams)

## CLEANUP & SAFETY

<b>Cleanup</b>	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 residual material. Wet Pyrocrete 239 overspray must be cleaned up with soapy or clean, potable water. Cured overspray may require chipping and/or scraping to remove.
<b>Safety</b>	Read and follow all caution statements on this product data sheet and on the SDS for this product. Employ normal workmanlike safety precautions. Use adequate ventilation. Keep container closed when not in use.
<b>Overspray</b>	Adjacent surfaces shall be protected from damage and overspray. Sprayed fireproofing materials may be difficult to remove from surfaces and may cause damage to architectural finishes. Cured overspray may require chipping and/or scraping to remove.
<b>Ventilation</b>	When used in enclosed areas, thorough air circulation must be used during and after application until the product is dry.

## PACKAGING, HANDLING & STORAGE

<b>Packaging</b>	50 lb. (22.7 kg) bags
<b>Shelf Life</b>	24 months (minimum) when kept at recommended storage conditions.

### PACKAGING, HANDLING & STORAGE

<b>Storage</b>	Store indoors in a dry environment between -20-150 °F (-29-66 °C)
	Material must be kept dry or clumping may occur.

<b>Shipping Weight (Approximate)</b>	50 lb. (22.7 kg)
------------------------------------------	------------------

### WARRANTY

To the best of our knowledge the technical data contained herein is true and accurate on the date of publication and is subject to change without prior notice. User must contact Carboline Company to verify correctness before specifying or ordering. No guarantee of accuracy is given or implied. We guarantee our products to conform to Carboline quality control. We assume no responsibility for coverage, performance, injuries or damages resulting from use. Carbolines sole obligation, if any, is to replace or refund the purchase price of the Carboline product(s) proven to be defective, at Carbolines option. Carboline shall not be liable for any loss or damage. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY CARBOLINE, EXPRESS OR IMPLIED, STATUTORY, BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. All of the trademarks referenced above are the property of Carboline International Corporation unless otherwise indicated.