SELECTION & SPECIFICATION DATA

Generic Type	A high density cementitious fireproofing material designed for the fire protection of exterior and interior structural steel sections
Description	A minimum average 52 lb./ft³ (833 kg/m³) density, portland cement-based fireproofing material that provides hydrocarbon pool fire, jet fire, and cryogenic spill protection for structural steel. Recommended areas of application include refineries, petrochemical, and LNG facilities.
Features	• UL 1709 hydrocarbon fire rated up to 4 hours • ISO 22899-1 jet fire rated from 30 minutes to 2 hours • ISO 20088-1 cryogenic spill protection to -50°C • Resistant to 4 bar blast overpressure • ISO 20088-1 cryogenic spill followed by ISO 22899-1 jet fire • 4 bar overblast followed by third party witnessed hydrocarbon fire • NFPA 290 simultaneous torch and hose stream resistant (extended to 150 minutes) • UL 2431 Category I-A Outdoor Heavy Industrial and Exterior Environmental Purpose • Lightweight - one-third the weight of concrete • Ideal for field and shop application • Enhanced application characteristics (3/4" - 1 1/2" (19 - 38.1 mm) on initial pass) • Excellent durability with early hardness development • Non-friable – high impact strength • Asbestos-free – complies with EPA and OSHA regulations
Color	Non-Uniform Speckled Gray Product color may vary due to variations in color of Portland cement.
Finish	Textured 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 341.
Primer	Pyrocrete 341 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. Contact the Carboline Fireproofing Technical Service for further information and approved primers.
Application Thickness	3/4" - 1 1/2" (19 - 38.1 mm) on initial pass
Theoretical Coverage Rates	14.40 - 13.30 bd.ft/bag @ dry density range of 52 - 55 lb./ft³ (1.34 - 1.24 m2/bag @ range of 833 - 882 kg/m³) Field results will vary depending upon application parameters. Coverage based on theoretical gross yield without loss. Material losses during mixing and application must be taken into account when estimating project requirements. Coverage based on 50 lb. (22.7 kg) bags plus 4.5 gallons (17.0 liters) of water. (one board ft = one ft² of material at one inch thick, or 1 m² of material at 25.4 mm thick).
Limitations	Not recommended for use as a refractory cement or where continuous operating temperatures exceed 200°F (93°C).

SELECTION & SPECIFICATION DATA

Topcoats	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. **Seal Coat** – 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 76. Carboguard 1340 may be applied after 24 hours of final application of Pyrocrete 341. Consult the Carboguard 1340 Product Data Sheet for minimum and maximum cure times. Alternatively, the use of Carboguard 1340 WB is an acceptable sealer for Pyrocrete 341. **Top Coat** – Surface hardness should be a minimum Shore DO 64 as measured with a durometer prior to application of the topcoat. **Caulking** – For exterior installations, Acrilast Caulk II or approved equivalent should be applied at all termination joints between Pyrocrete 341 and any dissimilar surface. Contact Carboline Fireproofing Technical Service for full information.

SUBSTRATES & SURFACE PREPARATION

General	Before applying Pyrocrete 341, the substrate coating must be free of all oil, grease, condensation, or other contamination.
Steel	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.
Galvanized Steel	Pyrocrete 341 is usually applied directly over galvanized surfaces, onto galvanized metal lath following UL design details. If priming is required, contact Carboline Fireproofing Technical Service for recommendations.
Concrete	The recommended primer to seal concrete before applying Pyrocrete 341 is Carboguard 1340.
Non-Ferrous Metals	Aluminum, copper and other non-ferrous metals shall be coated with a Carboline approved primer system.
Lathing & Attachments	2.5 lb./yd² (1.36 kg/m²) galvanized metal lath, may be pre-bent and tie-wired into place for appropriate design. In both contour and box configurations, lath shall overlap a minimum of 1" (25.4 mm) at all joints. Optionally, beam furring clips or electrically welded, pneumatic or self-tapping screws or studs, may be used. **Contour Design -** 2.5 lb./yd² (1.36 kg/m²) galvanized metal lath shall be pre-bent and tie wired into place in accordance with the tested design. Plastic-nosed corner beads may also be used for better thickness control and aesthetics on flange edges of steel. Please refer to design details. **Boxed Design -** 2.5 lb./yd² (1.36 kg/m²) galvanized metal lath wrapped around member spanning the web, overlapped 1" (25.4 mm) and tie-wired on the flange face 10" (254 mm) on center. For large webbed members, additional support for lath may be needed for ease of installation. Plastic-nosed corner beads may also be used for better thickness control and aesthetics. **Tower Skirts and Flat Surfaces -** Require that 2.5 lb./yd² (1.36 kg/m²) 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. 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. 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 or contact Carboline Fireproofing Technical Service.

PERFORMANCE DATA (TYPICAL VALUES)

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

Test Method	Results
ASTM D2240 Durometer Hardness (Shore DO)	88
ASTM D2794 Impact Resistance	Pass (No cracking at 23 ft-lbs. (31.19 J)
ASTM E605 Density[1]	52 - 55 lb./ft³ (833 - 881 kg/m³)
ASTM E736 Bond Strength (Unprimed Steel)[2]	23,734 psf (1,136 kPa)
ASTM E761 Compressive Strength	1,561 psi (10.76 MPa)
ASTM E937 Corrosion	0.00 g/mm²
Coverage per 50 lb. (22.7 kg) bag	14.40 – 13.30 bd.ft (1.34 - 1.24 m² @ 25.4 mm)
Explosion Resistance	>4 bar
NFPA 290 Hose Stream Resistance	Pass
UL 723 Flame Spread	0
UL 723 Smoke Development	0

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

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

[2] Bond strength testing performed utilizing ASTM E736 with AWCI Technical Manual 12-A modifications.
Physical property data was derived using 4.5 gallons (17.03 liters) of water per 50 lb. (22.7 kg) bag.
Material shall reach a hardness of Shore DO 64 prior to handling and topcoating.
Test reports and additional data available upon written request.

MIXING & THINNING

Mixer

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 341 typically requires a mixer volume of 8 ft³ (227 L) minimum. **Do not use pan type mixers.**

Mixing

Target water level: 4.5 gallons (17.03 liters)
Add 4.5 gallons (+/- 0.5 gallons) of clean, potable water to a mortar mixer with **rubber tipped blades**. With mixer running slowly, add powder and mix for 3-5 minutes (10 minutes maximum) until a homogeneous mortar-like consistency is achieved. Longer mixing times may result in lower densities. Total water must not exceed 5.0 gallons (18.9 liters) per 50 lb. (22.7 kg) bag.

Please reference the mixing instructions as shown on the packaging for product supplied in 55 lb. (25 kg) bag quantities.

Pot Life

6 hours at 70°F (21°C). Pot life ends when the material thickens and becomes unusable. Do not re-temper material.

Density

Target wet density:
73 - 82 lb./ft³ (1,169-1,313 kg/m³). Wet density measurements are critical to obtaining correct dry densities. When checking wet densities, use the following procedures:
Equipment needed:
• 1 liter (1000 cc) polyethylene cup
• Small metal spatula
• Scale accurate to 1 gram
Determination of Pyrocrete wet density:
• Weigh the empty cup to the nearest gram, then tare the scale.
• Use the spatula to fill the cup completely with mixed material (do not tamp cup).
• 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.

MIXING & THINNING

- Weigh the filled cup to the nearest gram.
- Record the weight of material in grams. This value equals the wet density in grams/liter and kg/m³
- To calculate the wet density of the material in lb./ft³, multiply the value in grams/liter by 0.0624.

Contact Carboline Fireproofing Technical Service for additional details.

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.

Pump
This material can be pumped with a wide range of piston, rotor stator and squeeze pumps designed to pump cement & plaster materials including:
Essick - model FM9/FM5E (Rotor Stator/2L4)
Putzmeister - model S5EV (Rotor Stator/2L6)
Hy-Flex - model HZ-30E (Rotor Stator/2L6)
Hy-Flex - model H321E (Piston)

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

Material Hose
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' (3m) length of 1" (25.4 mm) I.D. hose may be added at the gun for use as a whip. Maximum hose length of 300' (91 m).

Nozzle/Gun
Standard plasterers gun with 3/8" - 1/2" fluid tip

Compressor
Be certain that the air supply is a minimum 22 cfm at 100 psi (689 kPa) and higher when distances longer than 75' (22 m) are required.

Air Line
Use ½" (12.7 mm) I.D. line, with a minimum bursting pressure of 100 psi (689 kPa).

APPLICATION PROCEDURES

General
- Pyrocrete 341 may be applied by spray and/or trowel.
- Material build will depend on application method, weather conditions and equipment used.
- 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.
- Maximum time to achieve the full thickness is 3 days at 70°F (21°) and 50% relative humidity. This would be less at higher temperatures.
- All additional coats are applied monolithically to the entire perimeter of the member.
- **At no time shall Pyrocrete 341 be applied at a thickness less than ¼" (6.4 mm) or "skim" coated.**

Finishing
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)	1 Hour

Fresh Pyrocrete 341 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. Material shall reach a hardness of Shore DO 64 prior to handling and topcoating. For shipping and handling instructions of shop applied Pyrocrete 341 to individual steel members or modular steel sections, please contact your local Carboline Sales Representative or Carboline Fireproofing Technical Service.

CLEANUP & SAFETY

Cleanup | Pump, mixer and hose should be cleaned with clean, potable water at least once every 6 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 341 overspray must be cleaned up with soapy or clean, potable water. Cured overspray may require chipping and/or scraping to remove.

Safety | 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.

Overspray | 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.

Ventilation | When used in enclosed areas, thorough air circulation must be used during and after application until the product is dry.

TESTING / CERTIFICATION / LISTING

Underwriters Laboratories, Inc. | Pyrocrete 341 has been tested by Underwriters Laboratories, Inc. and is classified as Category I-A for exterior environmental exposure by UL in the following designs:
UL BYFH.R7209 Hydrocarbon Certification Report
UL 1709 Design XR747
UL 1709 Design XR747-1 Multi-Temperature Analysis
UL 2431 Category I-A Outdoor Heavy Industrial & Exterior Environmental Purpose
UL 2431 Acid and solvent spray exposures.

Intertek | ISO 20088-1 cryogenic resistance
ISO 20088-1 cryogenic spill protection followed by ISO 22899-1 jet fire exposure
NFPA 290 Hose Stream (extended up to 150 minutes)

SwRI | ISO 22899-1 Jet fire exposure

BakerRisk | 4 bar overblast exposure followed by UL 1709 hydrocarbon fire exposure

PACKAGING, HANDLING & STORAGE

Packaging | 50 lb. (22.7 kg) bags

Shelf Life | 24 months (minimum) when kept at recommended storage conditions.

PACKAGING, HANDLING & STORAGE

Storage	Store indoors in a dry environment between -20°F - 150°F (-29°C - 66°C) Material must be kept dry or clumping may occur. If hardened material if found, do not use.
Shipping Weight (Approximate)	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.