

## Selection & Specification Data

<b>Generic Type</b>	High density cementitious fireproofing designed for the fire protection of exterior and interior structural steel.
<b>Description</b>	A 881kg/m <sup>3</sup> density, Portland cement-based, cementitious fireproofing. It provides both hydrocarbon and cellulosic fire protection for structural steel and can also be used to upgrade the fire resistance of existing concrete. Recommended areas of application include refineries, petrochemical, pharmaceutical facilities, pulp and paper mills, offshore platforms, nuclear and conventional power plants, factories, warehouses, institutional and biomedical facilities.
<b>Features</b>	<ul style="list-style-type: none"> <li>- Over 35 years of proven performance.</li> <li>- Exceptional durability and toughness.</li> <li>- UL 1709 hydrocarbon fire rated up to 4 hours.</li> <li>- BS 476 hydrocarbon fire rated up to 4 hours.</li> <li>- ISO 22899-1 jet fire rated up to 2 hours.</li> <li>- ASTM E119 cellulosic fire rated up to 4 hours.</li> <li>- Cryogenic protection against LNG spills and immersion exposures.</li> <li>- Resistant to 3 bar blast overpressure.</li> <li>- Hose stream resistant.</li> <li>- Tolerant to a wide range of climates.</li> <li>- Lightweight – one-fifth the weight of concrete for equal fire protection.</li> <li>- Ideal for onsite and offsite applications.</li> <li>- Easy application by spray or trowel.</li> <li>- Non-flammable – during or after application.</li> <li>- Chloride and sulfide free – no special priming required.</li> <li>- Non-friable – high impact strength.</li> </ul>
<b>Colour</b>	Non-uniform Speckled Grey Product colour may vary due to variations in colour of Portland cement.
<b>Finish</b>	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 241.
<b>Primer</b>	Pyrocrete 241 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 StonCor Africa approved alkaline resistant primer. Contact StonCor Africa Fireproofing Technical Service for further information and approved primers.
<b>Fireproofing Topcoats</b>	Generally not required. In severe corrosive atmospheres, topcoats may be used for added durability and chemical resistance. Consult StonCor Africa Fireproofing Technical Service for selection of the coating most suitable for the operating environment. <b>Seal Coat:</b> 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 241. Consult the Carboguard 1340 product data sheet for minimum and maximum cure times. <b>Topcoat:</b> Surface hardness should be a minimum Shore DO64 as measured with a durometer prior to application of the topcoat. Normally this minimum dry time is 10 days at 21°C and 40 days at 4°C, for a thickness of 25mm or less. <b>Caulking:</b> For exterior installations, Acrilast caulk should be applied at all termination joints between Pyrocrete 241 and the substrate. Contact StonCor Africa Fireproofing Technical Service for full information.

<b>Application Thickness</b>	13 to 16mm on initial pass
<b>Theoretical Coverage Rate</b>	1.23m <sup>2</sup> at 25mm thick at 881kg/m <sup>3</sup> 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.
<b>Limitations</b>	Not recommended for use as a refractory cement or where continuous operating temperatures exceed 93°C.

## Substrates & Surface Preparation

<b>General</b>	Before applying Pyrocrete 241, the substrate 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 StonCor Africa Fireproofing Technical Service for approved primers.
<b>Galvanized Steel</b>	Pyrocrete 241 is usually applied directly over galvanized surface. If priming is required, contact StonCor Africa Fireproofing Technical Service for recommendations.
<b>Concrete</b>	The recommended primer to seal concrete prior to applying Pyrocrete 241 is Carboguard 1340.
<b>Non-ferrous Metals</b>	Aluminum, copper and other non-ferrous metals shall be primed with one coat of Carbomastic 15.
<b>Lathing &amp; Attachments</b>	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. <b>Contour Design:</b> 1.85kg/m <sup>2</sup> Galvanized metal lath wrapped around the flange edges towards the web approximately 38mm. Contour column designs allow the use of 50mm x 50mm galvanized or PVC coated hexagonal metal mesh with beam furring clips as an alternate to the 1.85kg/m <sup>2</sup> galvanized metal lath. Plastic-nosed corner beads may also be used for better thickness control and aesthetics on flange edges of steel. Please refer to design details. For contour applications on structural members with web span greater than 406mm or flange widths greater than 304mm, refer to the UL Fire Resistance Directory under "Coating Materials" section. <b>Boxed Design:</b> 1.85kg/m <sup>2</sup> Galvanized metal lath wrapped around the member spanning the web, overlapped 25mm and tie-wired on the flange face 304mm 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. <b>Tower Skirts and Flat Surfaces:</b> Require that 1.85kg/m <sup>2</sup> galvanized metal lath be anchored on 304mm to 610mm 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 1.85kg/m <sup>2</sup> galvanized lath. Mesh shall be 50mm x 50mm 20 gauge wire coated with PVC.

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# Pyrocrete® 241

## Substrates & Surface Preparation

### Lathing & Attachments

#### Tower Skirts and Flat Surfaces (Cont.)

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 3m centers, both horizontally and vertically. Please refer to design details or contact StonCor Africa Fireproofing Technical Service.

## Performance Data (Typical Values)

Test Method	Results
Durometer Hardness Shore DO ASTM D2240	83
Impact Resistance ASTM D2794	Pass
Density <sup>1</sup> ASTM E605	881kg/m <sup>3</sup> (minimum average)
Bond Strength (Unprimed steel) <sup>2</sup> ASTM E736	1054 KPa
Deflection ASTM E759	Pass
Bond Impact ASTM E760	Pass
Compressive Strength ASTM E761	7.6 MPa
Flame Spread ASTM E84	0
Smoke Development ASTM E84	0
Corrosion ASTM E937	0.00 gm/mm <sup>2</sup>
Explosion Resistance	3 bar
NFPA 58 Annex H Torch / Hose Stream Resistance	Pass
Shrinkage	<0.5%

1 Air dry at ambient conditions until constant weight is achieved. Do not force dry. Use ASTM E605 Positive Bead Displacement modified to use 1mm ceramic beads.

2 Bond strength testing performed utilizing ASTM E736 with AWSI 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 18.7 litres of water per 25kg bag. Material shall reach a hardness of Shore DO 64 prior to handling and topcoating. Test reports and additional data available upon written request.

## 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 and 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 # H320E (Piston)
- Strong Mfg – model # Spraymate 60 (Rotor Stator/2L6)
- Airtech – model # Swinger (Piston)
- Mayco – model # PF30 (Dual Piston)
- Thomsen – model # PTV 700 (Dual Piston)

### Trowel

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

### Material Hose

Minimum 25.4mm I.D. hose with 300 psi minimum

bursting pressure. For lengths over 15m, use 38mm to 76mm I.D. hose. Do not reduce hose diameter by more than 6.4mm per 7.6m unless a tapered conical reducer equipped with swivel fitting is used. A 3m length 19mm I.D. hose may be added at the gun for use as a whip.

### Nozzle / Gun

Binks – part # 7E2 (47-49 fluid tip, 3/8"-1/2" air cap)  
Graco – part # 204000 (10-12mm fluid tip / air cap)  
Speedflow – part # 701 (10-12mm fluid tip / air cap)  
Airtech – Internal mix with 10-12mm fluid tip  
Standard plasterers gun with 10-12mm fluid tip

### Compressor

Be certain that the air supply is a minimum 600l/m at 689 KPa and higher when distances longer than 22m are required.

### Air Line

Use 12mm I.D. line with a minimum bursting pressure of 689 KPa.

## Mixing & Thinning

### Mixer

Use a heavy-duty mortar mixer with **rubber tipped blades** that will scrape the sides and bottom of the mixer. A 25kg bag of Pyrocrete 241 typically requires a mixer volume of 250L minimum. **Do not use pan type mixers.**

### Mixing

**Target water level – 16 litres**

**Water level range – 14-18 litres**

Add clean, potable water to a mortar mixer with rubber tipped blades. With mixer running slowly, add powder and mix for 5 minutes until a homogenous mortar-like consistency is achieved. Longer mixing times may result in lower densities. Total water must not exceed 18 litres per 25kg bag.

In cool weather, warm water may be used to enhance application. In hot weather, cold water may be used.

### Pot Life

2 Hours at 21°C and less at higher temperatures. Pot life ends when the material thickens and becomes unusable.

### Density

**Target wet density – 1,217 to 1,313kg/m<sup>3</sup>.** Wet density measurements are critical to obtaining correct dry densities. To check wet densities, fill a Dixie cup (or other suitable container of known volume in grams) with mixed material. Screenshot 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.

Contact StonCor Africa Fireproofing Technical Service for additional details.

## Application Procedures

### General

Pyrocrete 241 may be applied by spray and/or trowel. Material build will depend on application method, weather conditions and equipment used. For application overhead, a scratch coat of up to 12mm is recommended to key into the lath. Allow to set for approximately 1 to 2 hours at 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, material should then be dampened with water before application of additional coats.

- Maximum time to achieve the full thickness is 3 days at 21°C 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 241 be applied at a thickness less than 6mm or "skim" coated.**

### Finishing

Material can be left as sprayed or finished with a trowel for better aesthetics.

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# Pyrocrete® 241

## Application Conditions

Condition	Material	Surface	Ambient	Humidity
Minimum	4°C	4°C	4°C	0%
Maximum	38°C	52°C	43°C	95%

## Curing Schedule

Surface Temp and 50% Relative Humidity	Dry to Recoat
21°C	2 Hours

Fresh Pyrocrete 241 must be protected from rain or running water for 24 hours at 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 2°C for 24 hours after application. Material shall reach a hardness of Shore DO64 prior to handling and topcoating.

## Clean-up & Safety

<b>Clean-up</b>	Pump, mixer and hose should be cleaned with clean, potable water at least once every 4 hours at 21°C, and more often at higher temperatures. Sponges should be run through the hoses to remove residual material. Wet Pyrocrete 241 overspray must be cleaned up with soapy or clean, potable water. Cured overspray may be require chipping and/or scraping to remove.
<b>Safety</b>	Follow all safety precautions on the Material Safety Data Sheet. It is recommended that personal protective equipment be worn, including spray suits, gloves, eye protection and respirators.
<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>	In enclosed areas, ventilation shall be 4 complete air exchanges per hour until the material is dry.

## Testing, Certification, Listing

<b>Underwriters Laboratories Inc.</b>	Pyrocrete 241 has been tested by Underwriters Laboratories Inc., and is classified for exterior or interior use by UL in the following designs: <b>UL 1709</b> Rapid temperature rise hydrocarbon fire exposure <b>Columns – XR701, XR702, XR734</b> <b>BS 476: Part 20: Appendix D</b> Hydrocarbon fire exposure <b>Columns – Report No. R11193</b> <b>Cryogenic Testing</b> Tested in accordance to “Specification for Cryogenic Protection and Passive Fire Protection of Structural Members”, dated March 2006 from South Hook LNG Terminal Company Ltd. Additional splash and spill testing perform at varying flow rates. All testing has been witnessed by UL. <b>ASTM E119 (UL 263, NFPA 251)</b> Cellulosic fire exposure <b>Columns – X732, X733, X735, X736, X743, X744, Y707, Y708</b> <b>Roof Assembly – P734, P735, P736, P737, P738, P739, P926, P927, P928, P929, G706, G707, G708, J713, J714, J715, J716</b> <b>Beams – N715, N716, N717, N718, N771, N772, N773, N774, N775, S706, S713, S731, S732, S733</b> <b>Floor Ceiling Assembly – D774, D767, D768, D769, D770, D771, D772, D773, D774, D775, D776, D777, D927, D928</b>
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### Walls – U704

**City of New York**  
MEA No. 172-80-M (Columns)  
MEA No. 173-80-M (Columns W14 x 233)  
MEA No. 174-80-M (Beams)

**City of Los Angeles**  
RR24763

**FM Global**  
Tested and listed by FM Global for structural test and LPG vessels at 10mm thickness from face of metal lath for 2 hour rating, including hose stream endurance test.

**City of San Francisco**  
164 C57.7A

**Det Norske Veritas**  
3 bar overblast protection

**Lloyds Register**  
J-120 jet fire protection – Certificate No. SAS F130010

## Packaging, Handling & Storage

<b>Shelf Life</b>	24 Months (minimum) when kept at recommended storage conditions.
<b>Shipping Weight (Approximate)</b>	25kg
<b>Storage</b>	Store indoors in a dry environment between -29°C to 66°C Material must be kept dry or clumping may occur.
<b>Packaging</b>	25kg



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