

**PART 1 GENERAL**

**1.01 WORK INCLUDED**

- A. Provide materials, labor, and equipment necessary to install fireproofing as shown on the drawings and as specified herein, in accordance with contract documents.

**1.02 RELATED WORK**

- A. Specified elsewhere:
  1. 01010 - Project Summary
  2. 01410 - Testing Laboratory Services
  3. 05100 - Structural Metal Framing
  4. 05310 - Steel Floor Deck
  5. 07270 - Firestopping
  6. 09250 - Gypsum Drywall
  7. 09800 - Special Coatings

(Note: If steel is required to be primed, or if topcoating is required for harsh environments, contact your Carboline sales representative for compatible coatings).

**1.03 QUALITY ASSURANCE**

- A. Application of fireproofing shall be performed by a qualified applicator acceptable to the Carboline Company, St. Louis, MO.
- B. A Certified Installation Certificate must be completed and submitted at end of project.
- C. Provide materials and construction for hourly ratings listed in the Underwriters Laboratories, Inc. Fire Resistance Directory or as calculated by the American Iron and Steel Institute formula.
- D. Field constructed mock-up: Apply sample section to representative substrates on site. Mock-up should include primer, fireproofing at required thickness, density, and finished surface, and all finish coatings.

**1.04 REFERENCES**

- A. American Society for Testing and Materials (ASTM)
  1. E84 Surface Burning Characteristics
  2. E119 Fire Tests of Building Construction
  3. E605 Thickness and Density
  4. E736 Cohesion / Adhesion
  5. E759 Deflection
  6. E760 Impact on Bonding
  7. E767 Compressive Strength
  8. D790 Flexural Properties
  9. E859 Air Erosion
  10. E937 Corrosion of Steel
- B. Underwriters Laboratories, Inc. Fire Resistance Directory (UL 1709).
- C. American Iron and Steel Institute, Designing Fire Protection for Steel Columns.

**1.05 SUBMITTALS**

- A. Product Data: Submit manufacturer's current Product Data and Application Instructions.
- B. Fireproofing manufacturer's certification that the materials to be supplied comply with the specifications and are suitable for the use intended.
- C. Fireproofing manufacturer's certification that the minimum performance standards as required under Section 2.01-A can be met and test reports supplied as requested.
- D. Schedule of Underwriters Laboratories, Inc. designs or American Iron and Steel Institute calculations to achieve the required hourly ratings.
- E. At completion of project, Certified Installation Certificate.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Material shall be delivered in original unopened packages, identified as to manufacturer and type,

bearing the proper Underwriters Laboratories, Inc. label for fire resistance construction.

- B. Material shall be stored above ground, kept dry until ready for use. Materials shall be used prior to expiration date.

**1.07 SITE CONDITIONS**

- A. Minimum application temperature for air and substrate must be 40°F. If required for project progress, General Contractor shall provide enclosures with heat to maintain temperatures.
- B. General Contractor shall provide ventilation for proper drying of the fireproofing during and after its application. In poorly ventilated areas, forced air shall be used to achieve a total air exchange of four times per hour until the material is substantially dry.
- C. After application, fireproofing must be protected from running water or rain for 24 hours at 70°F or longer at lower temperatures.

**1.08 SEQUENCING**

- A. Coordinate application of fireproofing with related work specified in other sections to comply with the following requirements:
  1. Prevent deterioration due to exposure to unfavorable environmental conditions.
  2. Protect fireproofing from abrasion and other damage likely to occur during construction operations after its application.
  3. Install fireproofing prior to installation of enclosing or concealing work, allowing sufficient time for inspection, testing, and correction of defective fireproofing.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Cementitious fireproofing shall be Carboline Pyrocrete 241 HD, applied to provide compliance with all drawings, specifications, and the following performance criteria:
  1. Dry Density: The in place density shall be measured in accordance with ASTM E605. Average and individual density shall be 70 pcf respectively.
  2. Bond Strength: When tested in accordance with ASTM E736 over steel, fireproofing shall have a minimum bond strength of 3563 psf.
  3. Compressive Strength: Fireproofing shall achieve an average value of 1546 psi when tested in accordance with ASTM E761.
  4. Deflection Resistance: Material shall not crack or delaminate from the surface when tested by ASTM E759.
  5. Corrosion: Material shall show 0.00 gm/mm<sup>2</sup> of corrosion when tested by ASTM E937.
  6. Impact Resistance: Material shall not crack or delaminate from the surface when tested by ASTM E760.
  7. Hardness: When tested for Shore DO hardness by ASTM D2240, the results shall average a minimum of 84.

**PYROCRETE 241 HD TECHNICAL GUIDE SPECIFICATION**

- 8. Surface Burning Characteristics: Maximum flame spread and smoke development shall be 0 and 0 when tested under ASTM E-84.
- B. Fireproofing shall have been tested by Underwriters Laboratories, Inc. in accordance with the procedures of UL 1709.
- C. Fireproofing shall be investigated for exterior use by Underwriters Laboratories, Inc.
- D. Fireproofing shall be free of asbestos, mineral fibers, polystyrene, or other known materials which may be considered hazardous either during mixing, application curing, or chemical release in a fire.
- E. Mix water shall be potable and free from such amounts of mineral or organic substances that would effect application or set of material.

**2.02 ACCESSORIES**

- A. Metal Lath: Shall be 2.5 or 3.4 lbs./sq. yd according to the appropriate Underwriters Laboratories, Inc. design and/or Carboline Company application criteria.
- B. Reinforcing Mesh: Shall be No. 19 SWG galvanized steel wire as described in appropriate Underwriters Laboratories, Inc. design.
- C. Furring Clips: Clips consist of No. 11 SWG galvanized steel wire 1 inch deep with 1½ and/or 1¾ inch long legs, supplied by Carboline Company, St. Louis, MO.
- D. Plastic Nose Cornerbead: Optional; supplied by Carboline Company, St. Louis, MO.
- E. Caulk: Caulking shall be Acrilast 570 as supplied by the Carboline Company, St. Louis, MO.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. All surfaces to be fireproofed shall be cleaned to the satisfaction of the applicator. Surface preparation shall be the responsibility of the steel fabricator, General Contractor, or trade effecting improper adhesion.
- B. Primed steel must follow the current Underwriters Laboratories, Inc. application requirements for bond and/or mechanical attachment.
- C. Unprimed steel must follow the application requirements of Carboline Company, St. Louis, MO.
- D. Verify that objects which will penetrate fireproofing such as clips, hangers, support sleeves, etc. are securely attached to the substrate.
- E. Verify that substrates are not obstructed by ducts, piping, equipment, or other construction which might interfere with fireproofing application. If obstruction(s) are evident, General Contractor to have responsible trade remove obstruction until fireproofing is completed in the area.
- F. Do not proceed with fireproofing application until all unsatisfactory conditions have been corrected.

**3.02 PREPARATION**

- A. Clean substrates, removing dirt, dust, oil, grease, loose material, incompatible primers, or other substances which may impair bonding of fireproofing to the substrate.

- B. Where required, install metal lath and/or reinforcing mesh per the Underwriters Laboratories, Inc. and Carboline Company design and application requirements.
- C. Corner beads, when used, shall be mechanically fastened to the metal lath.
- D. Provide drop cloths, masking, or other satisfactory protection for surfaces not to receive fireproofing to prevent damage from overspray.

**3.03 APPLICATION**

- A. Comply with manufacturers current instructions for equipment and application procedures.
- B. Apply fireproofing in thickness and density required to achieve fire resistance ratings.
- C. Finish surface shall be (as sprayed), (skip-trowelled or rolled), or (smooth trowelled).
- D. Where required, caulk shall be installed at fireproofing terminations.

**3.04 FIELD QUALITY CONTROL**

- A. At the owner's expense, the engineer/architect may select an independent testing laboratory to sample and verify the thickness and density of the fireproofing in accordance with provisions of ASTM E605. Fireproofing for density may be sprayed or trowelled in separate, designated containers to minimize patching at site.
- B. Results of these tests shall be made available to all concerned at the completion of each floor or area.

**3.05 PROTECTION**

- A. Coordinate installation of fireproofing with other trades in order to minimize the need to cut or remove fireproofing. As other trades successfully complete installation of their work, maintain protection of fireproofed portions of the structure by repairing any areas which have been removed or damaged prior to concealment of fireproofing by other work.
- B. Fireproofing applicator shall post SLIPPERY WHEN WET signs in areas of active application. If applicable, the General Contractor shall install barriers to prevent other trades from entering the application area till the material dries or is cleaned.
- C. Areas subject to overspray that are to remain permanently exposed as detailed on the drawings, must be covered by drop cloths or other satisfactory protection to prevent contact with fireproofing material.

**3.06 PATCHING AND REPAIR**

- A. Fireproofing damaged by other trades shall be repaired by fireproofing applicator and paid for by the trade(s) causing damage.

**3.07 CLEANING**

- A. Except as detailed, surfaces are to be left in a scraped clean condition.
- B. At completion of fireproofing work, application equipment shall be removed from site.

**3.08 SCHEDULE**

- A. Fire resistance rating in hours shall be the following:

	Hour	Rest.	Unrest.
Floor Assembly	_____	_____	_____
Primary Floor Beams	_____	_____	_____
Secondary Floor Beams	_____	_____	_____
Roof Beams	_____	_____	_____
Columns, Supporting Floor	_____	_____	_____
Columns, Supporting Roof	_____	_____	_____
Rapid Rise Fire Exposure	_____	_____	_____

END OF SECTION