

**SECTION 07 81 00**  
**APPLIED FIREPROOFING**

SPEC WRITER NOTES:

1. Use this section only for NCA projects.
2. Delete between //\_\_\_\_// if not applicable to project. Also delete any other item or paragraph not applicable in the section and renumber the paragraphs.
3. Verify that different types of fire rating are clearly defined for locations either on the drawings or in a schedule.
4. The following information will be shown on the project drawings or detailed in this section:
  - a. The extent and location of sprayed fire protection.
  - b. Fire resistance rating of each structural component to receive fireproofing, and whether the component is restrained or unrestrained as specified in UL Fire Resistance.
  - c. Fire protection other than that specified in this section for equivalent masonry, concrete or plaster fire protection on outside surfaces of exterior structural peripheral members.
  - d. The roof deck designs should utilize systems that do not require the underside of the decking to receive spray-applied fireproofing. This may require specifying a thicker deck or a different system. Due to flexing of the deck, spray-applied fireproofing will eventually become loose and be of no value.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies mineral fiber and cementitious coverings to provide fire resistance to interior structural steel members shown.
- B. Fire resistance ratings must be in accordance with the fire rated assemblies listed in UL Fire Resistance. Proposed materials not listed in UL Fire Resistance must have fire resistance ratings at least equal to the UL Fire Resistance ratings as determined by an approved independent testing laboratory, based on tests specified in UL 263 or ASTM E119. Submit reports and test records, attesting that the

fireproofing material conforms to the specified requirements. Prepare each test report to the report requirements specified by the test method. // For the underside of the decking use metal lath installed prior to the fireproofing material or rigid board fireproofing material as outlined in the UL Fire Resistance Directory Volume 1. //

### **1.2 SUSTAINABILITY REQUIREMENTS**

- A. Materials in this section may contribute towards contract compliance with sustainability requirements. See Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS, for project // local/regional materials, // low-emitting materials, // recycled content, // \_\_\_\_\_// requirements.

### **1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
  - 1. Manufacturer's complete and detailed application instructions and specifications.
  - 2. Manufacturer's repair and patching instructions.
- C. Certificates:
  - 1. Certificate from testing laboratory attesting fireproofing material and application method meet the specified fire ratings.
    - a. List thickness and density of material required to meet fire ratings.
    - b. Include complete test report and test record.
  - 2. Manufacturer's certificate indicating sprayed-on fireproofing material supplied under the Contract is same within manufacturing tolerance as fireproofing material tested.
- D. Miscellaneous:
  - 1. Manufacturer's written approval of surfaces to receive sprayed-on fireproofing.
  - 2. Manufacturer's written approval of completed installation.
  - 3. Manufacturer's written approval of the applicators of fireproofing material.

### **1.4 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Deliver to jobsite in sealed containers marked and labeled to show manufacturer's name and brand and certification of compliance with the specified requirements.
- B. Remove damaged containers from the site.

- C. Store the materials off the ground, under cover, away from damp surfaces.
- D. Keep dry until ready for use.
- E. Remove materials that have been exposed to water before installation from the site.

**1.5 QUALITY CONTROL**

- A. Manufacturer's Qualifications:
  - 1. Test for fire endurance in accordance with ASTM E119, for fire rating specified, in a nationally recognized laboratory.
  - 2. Capable of inspection and approval of surfaces to receive fireproofing as specified under paragraph Examination.
  - 3. Manufacturer's representative authorized to approve fireproofing applications.
  - 4. Manufacturer's representative authorized to approve completed installation.
  - 5. Manufacturer's representative to observe and advise at the commencement of application, visiting the site as required thereafter for the purpose of ascertaining proper application.
- B. Installer Qualifications: Installer to be certified, licensed, or otherwise qualified by the spray-applied fireproofing manufacturer as having the necessary experience, staff, and training to install the manufacturer's products in accordance with specified requirements. Submit manufacturer's certification that each listed installer is qualified and trained to install the specified fireproofing. Show evidence that each fireproofing installer has had a minimum of 3 years' experience in installing the specified type of fireproofing. A manufacturer's willingness to sell its products to the Contractor or installer does not infer qualification of the buyer.
- C. Pre-Application Test Area:
  - SPEC WRITER NOTES:
    - 1. Modify requirement for extent of test area to suit project conditions.
    - 2. Apply test to each type of substrate.
  - 1. Apply a test area consisting of a typical overhead fireproofing installation, including not less than 4.5 m (15 feet) of beam and deck.
    - a. Apply to one column.
    - b. Apply for the hourly ratings used.

2. Install in location selected by the RE/COR, for approval by the representative of the fireproofing material manufacturer and by the Government.
3. Perform Bond test on painted steel in accordance with ASTM E736.
4. Do not proceed in other areas until installation of test area has been completed and approved.
5. Keep approved installation area open for observation as criteria for sprayed-on fireproofing.

#### 1.6 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

SPEC WRITER NOTES:

1. Remove reference citations that do not remain in Part 2 or Part 3 of edited specification.
2. Verify and make dates indicated for remaining citations the most current at date of submittal; determine changes from date indicated on the TIL download of the section and modify requirements impacted by the changes.

- B. American Society for Testing and Materials (ASTM):

C841-03(2018)	Installation of Interior Lathing and Furring
C847-18	Metal Lath
E84-22	Surface Burning Characteristics of Building Materials
E119-22	Fire Tests of Building Construction and Materials
E605/E605M-19	Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members
E736/E736M-19	Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members
E759/E759M-92(2020)	The Effect of Deflection on Sprayed Fire-Resistive Material Applied to Structural Members
E760/E760M-92(2020)	Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members
E761/E761M-92(2020)	Compressive Strength of Fire-Resistive Material Applied to Structural Members

E859/E859M-93(2020)	Air Erosion of Sprayed Fire-Resistive Materials (SFRMs) Applied to Structural Members
E937/E937M-93(2020)	Corrosion of Steel by Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members
E1042-22	Classification for Acoustically Absorptive Materials Applied by Trowel or Spray
G21-15(2021)e1	Determining Resistance of Synthetic Polymeric Materials to Fungi

- C. FM Global (FM): Approval Guide, Latest Edition including Supplements
- D. Underwriters Laboratories, Inc. (UL): Fire Resistance Directory, Latest Edition including Supplements
- E. Warnock Hersey (WH): Certification Listings Latest Edition

#### **1.7 ENVIRONMENTAL CONDITIONS**

- A. Provide adequate ventilation to properly dry the fireproofing after application. In enclosed areas, provide a minimum of 4 air exchanges per hour by forced air circulation.

#### **PART 2 - PRODUCTS**

##### SPEC WRITER NOTES:

1. Make Material requirements agree with applicable requirements specified in the reference Applicable Publications.
2. Update and specify only that which applies to the project.
3. Allow option for use of both types of materials. See schedule paragraph.

#### **2.1 SPRAYED-ON FIREPROOFING**

- A. Provide spray-applied fireproofing material, including sealer, conforming to ASTM E1042, Class (a), Category A, Type I or Type II.
  1. Provide fireproofing for structural components concealed above the ceiling, or within a wall, chase, or furred space, with a minimum applied dry density of 240 kg per cubic meter (15 pounds per cubic foot) and a cohesion/adhesion strength of 9.57 kPa (200 psf).
  2. Provide fireproofing for exposed structural components, except where otherwise specified or indicated, with a minimum applied dry density of 350 kg per cubic meter (22 pounds per cubic foot) and a cohesion/adhesion strength of 20.83 kPa (434 psf).
- B. Materials containing asbestos are not permitted.
- C. Fireproofing characteristics when applied in the thickness and density required to achieve the fire-rating specified.

	Characteristic	Test	Results
1.	Deflection	ASTM E759	No cracking, spalling, or delamination when backing to which it is applied has a deflection up to 1/120 in 3m (10 ft.)
2.	Corrosion-Resistance	ASTM E937	No promotion of corrosion of steel.
3.	Bond Impact	ASTM E760	No cracking, spalling, or delamination.
4.	Air Erosion	ASTM E859	Maximum gain weight of the collecting filter 0.27gm/m <sup>2</sup> (0.025 gm/ft <sup>2</sup> ).
5.	Compressive Strength	ASTM E761	Minimum compressive strength 36 kPa (5 lbf/in <sup>2</sup> ).
6.	Surface Burning Characteristics with adhesive and sealer to be used	ASTM E84	Flame spread 25 or less smoke developed 50 or less
7.	Fungi Resistance	ASTM G21	Resistance to mold growth when inoculated with aspergillus niger (28 days for general application)

## 2.2 ADHESIVE

- A. Bonding adhesive for Type II (fibrous) materials as recommended and supplied by the fireproofing material manufacturer.
- B. Adhesive may be an integral part of the material or applied separately to surface receiving fireproofing material.

## 2.3 SEALER

- A. Sealer for Type II (fibrous) material as recommended and supplied by the fireproofing material manufacturer.
- B. Surface burning characteristics as specified for fireproofing material.
- C. Fungus resistant.
- D. Sealer may be an integral part of the material or applied separately to the exposed surface. When applied separately use contrasting color pigmented sealer, white preferred.

## 2.4 WATER

- A. Clean, fresh, and free from organic and mineral impurities.
- B. pH of 6.9 to 7.1.

**2.5 MECHANICAL BOND MATERIAL**

- A. Expanded Metal Lath: ASTM C847, minimum weight of 0.92 kg/m<sup>2</sup> (1.7 pounds per square yard).
- B. Fasteners: ASTM C841.

**PART 3 - EXECUTION****3.1 EXAMINATION**

- A. Verify surfaces to receive fireproofing are clean and free of dust, soot, oil, grease, water soluble materials or any foreign substance which would prevent adhesion of the fireproofing material.
- B. Verify hangers, inserts and clips are installed before the application of fireproofing material.
- C. Verify ductwork, piping, and other obstructing material and equipment is not installed that will interfere with fireproofing installation.
- D. Verify concrete work on steel decking and concrete encased steel is completed.
- E. Verify temperature and enclosure conditions are required by fireproofing material manufacturer.

**3.2 APPLICATION**

- A. Do not start application until written approval has been obtained from manufacturer of fireproofing materials that surfaces have been inspected by the manufacturer or his representative and are suitable to receive sprayed-on fireproofing.
- B. Coordinate application of fireproofing material with other trades.
- C. Application of Metal Lath:
  - 1. Apply to beam and columns having painted surfaces which fail ASTM E736 Bond Test requirements in pre-application test area.
  - 2. Apply to beam flanges 300 mm (12 inches) or more in width.
  - 3. Apply to column flanges 400 mm (16 inches) or more in width.
  - 4. Apply to beam or column web 400 mm (16 inches) or more in depth.
  - 5. Tack weld or mechanically fasten-on maximum of 300 mm (12 inch) center.
  - 6. See design criteria section of the approved assemblies used.
  - 7. Lap and tie lath member in accordance with ASTM C841.
- D. Mix and apply in accordance with manufacturer's instructions.
  - 1. Mechanically control material and water ratios.
  - 2. Apply adhesive and sealer, when not an integral part of the materials, in accordance with the manufacturer's instructions.

3. Apply to density and thickness indicated in UL Fire Resistance Directory, FM Approval Guide, or WH Certification Listings unless specified otherwise. Test in accordance with ASTM E119.

SPEC WRITER NOTES:

1. Use Type I material in high traffic areas where it is not encased and subject to possible damage due to accessibility, like columns in interstitial spaces and mechanical equipment rooms.
  2. Use of Type II material is an option where material is covered up by subsequent construction and not readily accessible. Type II material with 22-pound density may be used in some exposed areas.
4. Minimum applied dry density per cubic meter (cubic foot) for the underside of the walk on deck (interstitial) hung purlin or beam and steel deck, columns in interstitial spaces and mechanical equipment rooms to be as follows:
    - a. Type I - 240 kg/m<sup>3</sup> (15 lb/ft<sup>3</sup>).
    - b. Type II - 350 kg/m<sup>3</sup> (22 lb/ft<sup>3</sup>).
- E. Application must be completed in one area, inspected and approved by RE/COR before removal of application equipment and proceeding with further work.

### 3.3 FIELD TESTS

- A. Tests of applied material will be performed by VA retained Testing Laboratory. See Section 01 45 29, TESTING LABORATORY SERVICES.
- B. RE/COR will select area to be tested in specific bays on each floor using a geometric grid pattern.
- C. Test for thickness and density in accordance with ASTM E605. Areas showing thickness less than that required as a result of fire endurance test will be rejected.
- D. Areas showing less than required fireproofing characteristics will be rejected on the following field tests.
  1. Test for Cohesion/Adhesion: ASTM E736.
  2. Test for Bond Impact Strength: ASTM E760.

### 3.4 PATCHING AND REPAIRING

- A. Inspect after mechanical, electrical and other trades have completed work in contact with fireproofing material, but before sprayed material is covered by subsequent construction.



B. Perform corrective measures in accordance with fireproofing material Manufacturer's recommendations.

1. Respray areas requiring additional fireproofing material to provide the required thickness and replace dislodged or removed material.
2. Spray material for patching by machine directly on point to be patched, or into a container and then hand apply.
3. Hand mixing of material is not permitted.

C. Repair:

1. Respray all test and rejected areas.
2. Patch fireproofing material which is removed or disturbed after approval.

D. Perform final inspection of sprayed areas after patching and repair.

SPEC WRITER NOTES:

1. Spray-on fireproofing materials are restricted on the surfaces listed in Schedule A. This does not exempt these surfaces from the required fire protection. Designer must select other fire protection measures, like enclosing in plaster or concrete to provide necessary fire rating.

**3.5 SCHEDULE**

A. Apply fireproofing material in interior structural steel members // and on underside of interior steel floor and roof decks //, except on following surfaces:

1. Areas used as air handling plenums.
2. Steel to be encased in concrete or designated to receive other type of fireproofing.

B. Apply fireproofing to structural steel members, with the following hourly fire resistance rating and in accordance with the following UL design or approved equivalent.

Element	Hourly Rating	UL Design Reference
Columns supporting one floor	// _____ //	// _____ //
Columns supporting more than one floor	// _____ //	// _____ //
Columns supporting roof	// _____ //	// _____ //
Floor decks	// _____ //	// _____ //
Floor supports	// _____ //	// _____ //
Roof decks	// _____ //	// _____ //
Roof supports	// _____ //	// _____ //

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