SECTION 078100
APPLIED FIRE PROTECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Applied fire protection of interior structural steel not exposed to damage or moisture.

B. Applied fire protection of structural steel exposed to damage or moisture.

C. Preparation of applied fire protection for application of exposed overcoat finish specified elsewhere.

1.02 RELATED REQUIREMENTS

A. Section 051200 - Structural Steel Framing.

B. Section 052100 - Steel Joist Framing.

C. Section 053100 - Steel Decking.

D. Section 078400 - Firestopping.

E. Section 092116 - Gypsum Board Assemblies: Gypsum board fireproofing.

1.03 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

B. ASTM E605/E605M - Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members; 2019 (Reapproved 2023).

C. ASTM E736/E736M - Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members; 2019 (Reapproved 2023).

D. ASTM E759/E759M - Standard Test Method for Effect of Deflection on Sprayed Fire-Resistive Material Applied to Structural Members; 1992 (Reapproved 2023).

E. ASTM E760/E760M - Standard Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members; 1992 (Reapproved 2023).

F. ASTM E859/E859M - Standard Test Method for Air Erosion of Sprayed Fire-Resistive Materials (SFRMs) Applied to Structural Members; 2023.

G. ASTM E937/E937M - Standard Test Method for Corrosion of Steel by Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members; 1993 (Reapproved 2023).

H. UL (FRD) - Fire Resistance Directory; Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with placement of ceiling hanger tabs, mechanical component hangers, and electrical components.

B. Preinstallation Meeting: Convene one week before starting work of this section.

1.05 PERFORMANCE REQUIREMENTS

A. Sprayed-On Fireproofing Systems: Provide fire-rated assembly ratings to match UL Design Numbers as indicated on Drawings.

1.06 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittals procedures.

B. Product Data: Provide data indicating product characteristics and performance criteria.

C. Fire Testing: Submit evidence that the cementitious fireproofing has been subjected to full-scale ASTM E119 fire testing at Underwriters Laboratories Inc. by the manufacturer.

D. Test Reports: Reports from reputable independent testing agencies for proposed products, indicating compliance with specified criteria, conducted under conditions similar to those on project, as follows:

1. Bond Strength per ASTM E736.
2. Bond Impact per ASTM E760.
3. Compressive Strength per ASTM E761.
4. Fire tests using substrate materials similar those on project.

E. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

F. Manufacturer's Certificate: Certify that sprayed-on fireproofing products meet or exceed requirements of contract documents.

G. Manufacturer Reports: Indicate environmental conditions that applied fireproofing materials were installed.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience and approved by manufacturer.

C. Single Source Responsibility: Furnish products from one manufacturer for entire Project.
1. Provide fireproofing as complete system, including wire fabric, lath, hangers, and accessory items necessary for proper function.

1.08 FIELD CONDITIONS

A. Do not apply fireproofing when temperature of substrate material and surrounding air is below 40 degrees F or when temperature is predicted to be below said temperature for 24 hours after application.

B. Provide ventilation in areas to receive fireproofing during application and 24 hours afterward, to dry applied material.

C. Provide temporary enclosure to prevent spray from contaminating air.

D. Do not allow roof traffic during installation of roof fireproofing and drying period.

1.09 WARRANTY

A. See Section 017800 - Project Closeout, for additional warranty requirements.

B. Correct defective Work within a two year period after Date of Substantial Completion.
1. Include coverage for fireproofing to remain free from cracking, checking, dusting, flaking, spalling, separation, and blistering.
2. Reinstall or repair failures that occur within warranty period.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Applied Fire Protection:
1. GCP Applied Technologies: www.gcpat.com/sle.
2. Substitutions: See Section 01 60 00 - Product Requirements. Sprayed-Fiber products will not be accepted as a substitute.

2.02 APPLIED FIRE PROTECTION ASSEMBLIES

A. Provide assemblies as indicated on drawings.

2.03 MATERIALS

A. Medium Density Sprayed Fire-Resistive Material for Interior Applications: Manufacturer's standard factory mixed material, which when combined with water is capable of providing the indicated fire resistance, and conforming to the following requirements:
1. Bond Strength: 150 pounds per square foot, minimum, when tested in accordance with ASTM E736/E736M when set and dry.
2. Dry Density: 19 lb/cu ft, minimum, (Avg. 22 lb/cu ft) when tested in accordance with ASTM E605/E605M.

3. Effect of Impact on Bonding: No cracking, spalling or delamination, when tested in accordance with ASTM E760/E760M.
4. Corrosivity: No evidence of corrosion, when tested in accordance with ASTM E937/E937M.
5. Air Erosion Resistance: Weight loss of 0.025 g/sq ft, maximum, when tested in accordance with ASTM E859/E859M after 24 hours.
6. Surface Burning Characteristics: Maximum flame spread index of 0 (zero) and maximum smoke developed index of 0 (zero), when tested in accordance with ASTM E84.
7. Effect of Deflection: No cracking, spalling, or delamination, when tested in accordance with ASTM E759/E759M.
8. Manufacturers:
    a. GCP Applied Technologies; Monokote Z-106 G: www.gcpat.com/#sle.
    b. Substitutions: See Section 016000 - Product Requirements.

B. High Density Sprayed Fire-Resistive Material for Exterior Applications: Manufacturer's standard factory mixed material, which when combined with water is capable of providing the indicated fire resistance, and conforming to the following requirements:
1. Composition: Portland cement-based; not mineral fiber-based.
2. Bond Strength: 1,000 psf, minimum, when tested in accordance with ASTM E736/E736M when set and dry.
3. Dry Density: 40 lb/cu ft, minimum, when tested in accordance with ASTM E605/E605M.
4. Effect of Impact on Bonding: No cracking, spalling or delamination, when tested in accordance with ASTM E760/E760M.
5. Corrosivity: No evidence of corrosion, when tested in accordance with ASTM E937/E937M.
6. Air Erosion Resistance: Weight loss of 0.025 g/sq ft, maximum, when tested in accordance with ASTM E859/E859M after 24 hours.
7. Surface Burning Characteristics: Maximum flame spread index of 0 (zero) and maximum smoke developed index of 0 (zero), when tested in accordance with ASTM E84.
8. Manufacturers:
    a. GCP Applied Technologies; Monokote Z-146: www.gcpat.com/#sle.
    b. Substitutions: See Section 016000 - Product Requirements.

2.04 ACCESSORIES

A. Primer Adhesive: Of type recommended by applied fire protection manufacturer.

B. Overcoat: As recommended by manufacturer of applied fire protection material.

C. Metal Lath: Expanded metal lath; 3.4 lb/sq ft, galvanized finish as required to meet rated assembly.

D. Water: Clean, potable.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive fireproofing.

B. Verify that clips, hangers, supports, sleeves, and other items required to penetrate fireproofing are in place.

C. Verify that ducts, piping, equipment, or other items that would interfere with application of fireproofing have not been installed.

D. Verify that voids and cracks in substrate have been filled.

E. Verify that projections have been removed where fireproofing will be exposed to view as a finish material.

3.02 PREPARATION

A. Perform tests as recommended by fireproofing manufacturer in applications where adhesion of fireproofing to substrate is in question.

B. Remove incompatible materials that could effect bond by scraping, brushing, scrubbing, or sandblasting.

C. Prepare substrates to receive fireproofing in strict accordance with manufacturer.

D. Apply fireproofing manufacturer's recommended bonding agent on primed steel.

E. Protect surfaces not scheduled for fireproofing and equipment from damage by overspray, fall-out, and dusting.

F. Close off and seal duct work in areas where fireproofing is being applied.

3.03 APPLICATION

A. Apply primer adhesive, fireproofing, and overcoat in accordance with manufacturer's instructions.

B. Apply fireproofing in uniform thickness and density as necessary to achieve required ratings.

3.04 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Section 014000 - Quality Requirements.

B. Inspect installed fireproofing after application and curing for integrity, prior to its concealment.

C. Ensure that actual thicknesses, densities, and bond strengths meet requirements for specified ratings and requirements of authorities having jurisdiction (AHJ).

D. The contractor will engage a qualified independent testing and inspecting agency to perform thickness and density tests on installed fireproofing in accordance with ASTM E605.

E. The contractor will engage a qualified independent testing and inspecting agency to provide one cohesion/adhesion strength test at beams, columns, and decks in accordance with ASTM E736 for each 10,000 square feet of floor area or portion thereof, except conduct not fewer than two per floor.

F. Re-inspect installed fireproofing for integrity of fire protection, after installation of subsequent Work.

3.05 CLEANING

A. Remove excess material, overspray, droppings, and debris.

B. Remove fireproofing from materials and surfaces not required to be fireproofed.

C. Patch areas where inspection cuts and tests have been made.

D. Patch damage to fireproofing caused by other trades before final inspection of this work and prior to enclosure by other building components.

3.06 SCHEDULE

A. Schedule of Application:
   1. Medium Density Sprayed Fire-Resistive Material - Interior, concealed and exposed columns, beams and joists, inside elevator shafts and stairwells.
   2. High Density Sprayed Fire-Resistive Material - Interior or exterior, exposed columns, beams and joists in high traffic areas susceptible to abuse such as parking garages.

3.07 CONSTRUCTION CLASSIFICATION (REFERENCE ASTM E119 TABLE X3.1):

A. Wall bearing: Single span and simply supported end spans of multiple bays. Reference Paragraph 3.07.F.1
   1. Open-web steel joists or steel beams, supporting concrete slab, precast units, or metal decking. Unrestrained
   2. Concrete slabs, precast units, or metal decking. Unrestrained

B. Wall bearing: Interior spans of multiple bays.
   1. Open-web steel joists, steel beams or metal decking, supporting continuous concrete slab. Restrained
   2. Open-web steel joists or steel beams, supporting precast units or metal decking. Unrestrained

3. Cast-in-place concrete slab systems. Restrained
4. Precast concrete where the potential thermal expansion is resisted by adjacent construction. Restrained

C. Steel Framing:
1. Steel beams welded, riveted, or bolted to the framing members. Restrained
2. All types of cast-in-place floor and roof systems (such as beam-and-slabs, flat slabs, pan joists, and waffle slabs) where the floor or roof system is secured to the framing members. Restrained
3. All types of prefabricated floor or roof systems where the structural members are secured to the framing members and the potential thermal expansion of the floor or roof system is resisted by the framing system or the adjoining floor or roof construction. Reference Paragraph 3.07.F.2. Restrained

D. Concrete Framing:
1. Beams securely fastened to the framing members. Restrained
2. All types of cast-in-place floor or roof systems (such as beam-and-slabs, flat slabs, pan joists, and waffle slabs) where the floor system is cast with the framing members. Restrained
3. Interior and exterior spans of precast systems with cast-in-place joints resulting in restraint equivalent to that which would exist in condition III. Reference Paragraph 3.07.F.2.a. Restrained
4. All types of prefabricated floor or roof systems where the structural members are secured to such systems and the potential thermal expansion of the floor or roof systems is resisted by the framing system or the adjoining floor or roof construction. Reference Paragraph 3.07.F.2. Restrained

E. Notes:
1. Floor and roof systems can be considered restrained when they are tied into walls with or without tie beams, the walls being designed and detailed to resist thermal thrust from the floor or roof system.
2. For example, resistance to potential thermal expansion is considered to be achieved when:
   a. Continuous structural concrete topping is used.
   b. The space between the ends of precast units or between the ends of units and the vertical face of supports is filled with concrete or mortar, or the space between the ends of precise units and the vertical faces of supports, or between the ends of solid or hollow core slab units does not exceed 0.25% of the length for normal weight concrete members or 0.1% of the length for structural lightweight concrete members.

END OF SECTION