SECTION 07812 - APPLIED FIREPROOFING (NORMAL, MEDIUM & HIGH DENSITIES)

Part I - GENERAL

1.1 SCOPE OF WORK:

A. Work required by this section includes the furnishing of all labor, materials, equipment and other services to provide complete installation of applied fireproofing as required by the Project drawings and specifications and in conformance with building code requirements of authorities having jurisdiction.

1.2 RELATED SECTIONS:

A. Work included in other specification sections may impact the work required to meet the fire resistance requirements under this section. Related sections include, but may not be limited to, those listed below.

1. Structural Metal Framing Section 05100
2. Metal Decking Section 05300
3. Concrete Section 03050
4. Roof Insulation Section 07220
5. Lath & Plaster Section 09206
6. Gypsum Board Section 09250

NOTE TO SPECIFIER: Construction details resulting from work required by the related sections may influence the thickness requirements of fireproofing materials and the validity of the fire ratings. Fire Resistant Designs by ULI or others provide necessary design detail data.

1.3 QUALITY ASSURANCE:

A. Application Contractor: Fireproofing application contractor shall be acceptable to the manufacturer of the fireproofing materials based on the contractor’s experience and qualifications.

B. Fireproofing Material Characteristics: Fireproofing materials shall have the performance characteristics necessary to maintain the specified fire resistance under the prevailing service conditions of various Project locations identified herein.

C. Fire Resistance Ratings: Fireproofing materials shall be tested and listed for use in Fire Resistive Construction Designs which will provide fire resistance in accordance with the Fire Resistance Rating Schedule on the General Information Sheet of the Project Drawings.

D. Fire Resistive Designs: Fire resistive designs shall be those published in the Underwriters Laboratories “Fire Resistance Directory”, published directories of other testing agencies acceptable to U. S. Model Building Codes, or provided in other written form by the testing organization.

E. Pre-Application Coordination: General Contractor, Fireproofing Contractor, Independent Testing Laboratory and other construction team members as determined by the Architect shall attend a pre-application coordination meeting to review the Fireproofing Material and Thickness Schedule, substrate acceptability, application procedures, inspection procedures and other coordination issues.
1.4 REFERENCES:
C. ASTM E-136-93c – Behavior of Materials in a Vertical Tube Furnace at (750° C) 1400° F.
D. ASTM E-605-93 – Thickness and Density of Sprayed Fire-Resistive Material Applied to Structural Members.
I. ASTM E-859-93 – Air Erosion of Sprayed Fire-Resistive Materials Applied to Structural Members.
J. ASTM E-937-93 – Corrosion of Steel by Sprayed Fire-Resistive Materials Applied to Structural Members.

1.5 SUBMITTALS: (Refer to Section 01340.)
A. Fireproofing Material Schedule: Submit a schedule of fireproofing materials selected for application in each of the service condition locations of the Project as specified in paragraph 2.2.
B. Fire Resistive Designs: Submit a schedule of ASTM E-119 fire resistive designs from the “Fire Resistance Directory” by ULI, or designs from other qualified testing agencies, selected to meet the Fire Resistance Rating Schedule specified for the Project.
C. Fireproofing Thickness Schedule: For each material on the Fireproofing Material Schedule, submit a Thickness Schedule including the building elements to be protected, hourly rating requirements and fireproofing thickness to be applied.
D. Manufacturer’s Data: Submit manufacturers published data on the selected materials including Product Brochures, Data Sheets, Physical Characteristic Test Results and Installation Instructions.

PART 2 - PRODUCTS
2.1 CEMENTITIOUS FIREPROOFING:
A. All products shall be spray-applied cementitious fireproofing materials or accessory products for use with cementitious fireproofing. Products shall have a base of gypsum and/or Portland cement with the necessary aggregates, fillers and additives factory blended by the manufacturer to assure proper composition.
B. Mineral fiber based products and products containing asbestos are not acceptable.
2.2 SERVICE CONDITIONS:

A. Physical characteristics of the applied fireproofing materials shall be as required for reliable performance under the anticipated service conditions. Project service conditions in both the primary structure and locations having more demanding service conditions are specified in paragraphs 2.2 B and 2.2 C below.

B. Concealed and Out of Reach (COR) service conditions prevail in interior building locations with normal building atmospheres and minimal requirements for resistance to abuse. Fireproofing material under these service conditions will be concealed from view or direct contact by being out-of-reach in the finished state. Normal Density Cementitious Fireproofing, as defined herein, is specified for these service conditions in locations designated on the Drawings or described as follows: ______________________________________
____________________________________________________________________
____________________________________________________________________

C. Special service conditions that require additional fireproofing characteristics in order to assure longevity of the installed material under expected conditions of use are specified in the following paragraphs. The cementitious fireproofing required for each of the more demanding service conditions is also identified.

1. Exposed and Within Reach (EWR) service conditions are in locations with normal building atmospheres and moderate requirements for resistance to abuse because the material is exposed to view and direct contact in the finished condition. Medium Density Cementitious Fireproofing, as defined herein, is specified for these service conditions in the following locations. ______________________________________
____________________________________________________________________

2. High Humidity and Moist (HHM) service conditions are in locations with prolonged high humidity and/or moisture combined with moderate requirements for resistance to abuse. Medium Density Water Resistant Fireproofing, as defined herein, is specified for these service conditions in the following locations.
____________________________________________________________________
____________________________________________________________________

3. Abusive and Damaging Exposure (ADX) service conditions are in locations with activity that exposes the fireproofing to high potentials for physical abuse and damage or to direct weather exposure. High Density Exterior Fireproofing, as defined herein, is specified for these service conditions in the following locations.
____________________________________________________________________

NOTE TO SPECIFIER: Matching the fireproofing properties to the required service conditions is recommended in order to prevent either excessive initial construction costs, resulting from over specification, or a high potential for malfunctioning fireproofing when a fire occurs, resulting from under specification.

2.3 ACCEPTABLE MANUFACTURERS:

A. Applied Fireproofing shall be Southwest Fireproofing Products as manufactured by Southwest Fireproofing Products Co., Albuquerque, NM,
A/D Fire Protection Systems Inc., Columbia, NJ
A/D Fire Protection Systems Inc., Toronto, Ontario, Canada,
Aislantes Y Acusticos, Mexico, D F, Mexico.
2.4 ACCEPTABLE PRODUCTS:

A. Normal Density Cementitious Fireproofing to be applied in concealed and out of reach (COR) service conditions (defined in paragraph 2.2 B) shall be Southwest Fireproofing Products Type 5GP™ or Type 5EF™, as determined by Fire Resistive Design Selection.

NOTE TO SPECIFIER: Type 5GP™ is listed in most Fire Resistive designs, but Type 5EF™ is required in certain Designs for electrified floor systems.

Normal Density Cementitious Fireproofing shall be a gypsum cement based product and shall have physical properties that meet or exceed those listed below when tested in accordance with the referenced test methods.

1. Surface Burning Characteristics per ASTM E-84: Maximum flame spread of 0 and maximum smoke developed of 0.

2. Fire Resistance Classification per ASTM E-119: Fireproofing materials are to have been tested in accordance with ASTM E-119 by Underwriters Laboratories Inc. (ULI) or other organizations recognized by the U. S. Model Building Codes for this purpose.

3. Combustibility Classification per ASTM E-136: Fireproofing materials shall be classified as Non-Combustible.

4. Dry Density per ASTM E605: Minimum average density of 240 kg/m³ (15 pcf), with minimum individual measurements of 224 kg/m³ (14 pcf).

5. Cohesion/Adhesion Strength per ASTM E-736: Minimum of 975 kg/m² (200 psf) when applied to uncoated or galvanized steel.

6. Effect of Deflection per ASTM E-759: No cracking or delaminating of material.

7. Impact Resistance per ASTM E-760: No cracking or delaminating of material.

8. Compressive Strength per ASTM E-761: Minimum of 2,400 kg/m² (500 psf) at 10 percent deformation.

9. Air Erosion per ASTM E-859: Maximum weight loss of 0.05 g/m² (0.005 g/ft²).

10. Corrosion Resistance per ASTM E-937: No evidence of corrosion or bond failure.

B. Special service conditions defined and identified in paragraph 2.2 C require the fireproofing specified in the following paragraphs for the indicated special service condition.

1. Medium Density Cementitious Fireproofing scheduled for application in exposed and within reach (EWR) service conditions shall be Southwest Fireproofing Products Type 5MD™.

Medium Density Cementitious Fireproofing shall be a gypsum cement based product and shall have physical properties that meet or exceed those listed below when tested in accordance with the referenced test methods.

a. Surface Burning Characteristics per ASTM E-84: Maximum flame spread of 0 and maximum smoke developed of 0.

b. Fire Resistance Classification per ASTM E-119: Fireproofing materials are to have been tested in accordance with ASTM E-119 by Underwriters Laboratories Inc. (ULI) or other organizations recognized by the U. S. Model Building Codes for this purpose.

c. Combustibility Classification per ASTM E-136: Fireproofing materials shall be classified as Non-Combustible.
d. Dry Density per ASTM E-605: Minimum average density of 352 kg/m\(^3\) (22 pcf), with minimum individual measurements of 304 kg/m\(^3\) (19 pcf).

e. Cohesion/Adhesion Strength per ASTM E-736: Minimum of 20 KPa (500 psf) when applied to uncoated or galvanized steel.

f. Effect of Deflection per ASTM E-759: No cracking or delaminating of material.

g. Impact Resistance per ASTM E-760: No cracking or delaminating of material.

h. Compressive Strength per ASTM E-761: Minimum of 240 KPa (5,000 psf) at 10 percent deformation.

i. Air Erosion per ASTM E-859: Maximum weight loss of 0.05 g/m\(^2\) (0.005 g/ft\(^2\)).

j. Corrosion Resistance per ASTM E-937: No evidence of corrosion or bond failure.

2. Medium Density Water Resistant Fireproofing scheduled for application in High Humidity and Moist (HHM) service conditions shall be Southwest Fireproofing Products Type 7GP\(^{TM}\).

Medium Density Water Resistant Fireproofing shall be a Portland cement based product and shall have physical properties that meet or exceed those listed below when tested in accordance with the referenced test methods.

a. Surface Burning Characteristics per ASTM E-84: Maximum flame spread of 0 and maximum smoke developed of 0.

b. Fire Resistance Classification per ASTM E-119: Fireproofing materials are to have been tested in accordance with ASTM E-119 by Underwriters Laboratories Inc. (ULI) or other organizations recognized by the U. S. Model Building Codes for this purpose.

c. Combustibility Classification per ASTM E136: Fireproofing materials shall be classified as Non-Combustible.

d. Dry Density per ASTM E-605: Minimum average density of 304 kg/m\(^3\) (19 pcf), with minimum individual measurements of 288 kg/m\(^3\) (18 pcf).

e. Cohesion/Adhesion Strength per ASTM E-736: Minimum of 20 KPa (500 psf) when applied to uncoated or galvanized steel.

f. Effect of Deflection per ASTM E-759: No cracking or delaminating of material.

g. Impact Resistance per ASTM E-760: No cracking or delaminating of material.

h. Compressive Strength per ASTM E-761: Minimum of 240 KPa (5,000 psf) at 10 percent deformation.

i. Air Erosion per ASTM E-859: Maximum weight loss of 0.05 g/m\(^2\) (0.005 g/ft\(^2\)).

j. Corrosion Resistance per ASTM E-937: No evidence of corrosion or bond failure.

3. High Density Exterior Fireproofing specified for Abusive and Damaging Exposure (ADX) service conditions shall be Southwest Fireproofing Products Type 1XR\(^{TM}\) or approved alternate. High Density Exterior Fireproofing shall be a Portland cement based product and shall have physical properties that meet or exceed those listed below when tested in accordance with the referenced test methods.

a. Surface Burning Characteristics per ASTM E-84: Maximum flame spread of 0 and maximum smoke developed of 0.

b. Fire Resistance Classification per ASTM E-119: Fireproofing materials are to have been tested in accordance with ASTM E-119 by Underwriters Laboratories Inc. (ULI) or other organizations recognized by the U. S. Model Building Codes for this purpose.
c. Dry Density per ASTM E-605: Minimum average density of 640 kg/m$^3$ (40 pcf), with minimum individual measurements of 577 kg/m$^3$ (36 pcf).

d. Cohesion/Adhesion Strength per ASTM E-736: Minimum of 160 KPa (23.4 psi) when applied to uncoated or galvanized steel.

e. Compressive Strength per ASTM E-761: Minimum of 2,500 KPa (365 psi) at 10 percent deformation.

f. Corrosion Resistance per ASTM E-937: No evidence of corrosion or bond failure.

Accessory Products shall be as required by the selected Fire Resistant Designs or as recommended by the manufacturer of the applied fireproofing material.

Water for mixing cementitious fireproofing shall be clean, suitable for domestic use and free of chemical contaminants that adversely affects the fireproofing setting time or physical properties. Water quantity and flow rate to the mixing site shall be adequate to accommodate the required fireproofing mixing rates.

**PART 3 – EXECUTION**

### 3.1 MATERIAL DELIVERY AND STORAGE:

A. Materials shall be delivered in original unopened packages bearing name of manufacturer, product identification, and Underwriters Laboratories Inc. label.

B. Store materials under cover and off the ground or other damp surface and in a dry area.

C. Discard materials that are damaged from improper storage or exposed to water by any means before actual use.

### 3.2 APPLICATION ENVIRONMENT:

A. Do not apply fireproofing when temperature of substrate or surrounding air temperature is below 4.5°C (40°F) for 24 hours prior to, during and after application.

B. Provide sufficient ventilation, with fresh air intake, to avoid moisture build up or condensation in areas receiving fireproofing until after fireproofing has cured and dried.

### 3.3 PROTECTIVE MEASURES:

A. Provide temporary enclosures for spraying operations to prevent contamination of air or nearby property.

B. Protect adjacent surfaces and equipment from damage by overspray, fall-out and dusting-off of fireproofing.

C. Close off and seal ductwork in areas where fireproofing is being applied.

D. Protect applied fireproofing from damage. Coordinate installation with other trades to avoid cutting and patching of installed fireproofing.

### 3.4 PRE-INSTALLATION EXAMINATION:

A. Verify that surfaces to receive fireproofing are free of oil, grease, dirt, loose paint, mill scale or other matter that would impair bond. Do not proceed until defects are corrected. Where necessary the cleaning of steel surfaces to receive fireproofing shall be the responsibility of the general contractor.

B. Verify that painted steel surfaces to be fireproofed comply with fire resistant design requirements or ULI requirements for painted or primed steel, including any necessary bond tests.
C. Verify completion of preparatory work by others that is to be covered by fireproofing, including clips, hangers and other attachments.

D. Verify that ducts, piping, equipment or other items that would interfere with application of fireproofing are not positioned until fireproofing application is completed.

E. For application to underside of roof deck, verify that roofing application is completed and roof traffic has ceased.

F. For application to metal floor decking, verify that concrete work above is completed.

3.5 PREPARATION:
A. At contractor's option, attach metal lath or non-metallic mesh to one side of each steel joist web member in manner acceptable by approved Fire Resistive Designs.

B. Install accessory products required by Fire Resistive Designs, manufacturer or project specifications prior to application of fireproofing.

3.6 APPLICATION:
A. Apply fireproofing in accordance with manufacturer's recommendation to comply with fire rating requirements and approved fire resistance designs.

B. Spray-apply cementitious fireproofing using as many coats as necessary to obtain required thickness and uniform density.

C. Completely cover members scheduled to be fireproofed.

D. Fill areas between fluted steel deck and beam top flange with fireproofing as required by Fire Resistive Designs.

3.7 PATCHING:
A. Examine members for complete coverage, correct unacceptable work and patch.

B. Patch areas damaged or cut by subsequent work.

C. All patching and repairing of sprayed fireproofing, due to damage by other trades, shall be performed under this section and paid for by the trade(s) responsible for the damage.

3.8 CLEANING:
A. Remove equipment and thoroughly clean all surfaces of overspray deposits of fireproofing materials.

3.9 FIELD QUALITY CONTROL:
A. Inspection and testing as specified in Section 01410.

END OF SECTION