PART 1- GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 84	(1998) Surface Burning Characteristics of Building Materials
ASTM E 119	(1998) Fire Tests of Building Construction and Materials
ASTM E 605	(1993; R 1996) Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members
ASTM E 736	(1992) Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members
ASTM E 759	(1992; R 1996) Effect of Deflection on Sprayed Fire-Resistive Material Applied to Structural Members
ASTM E 760	(1992; R 1996) Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members
ASTM E 761	(1992) Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members
ASTM E 859	(1993) Air Erosion of Sprayed Fire-Resistive Materials (SFRMs) Applied to Structural Members
ASTM E 937	(1993) Corrosion of Steel by Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members
ASTM E 1042	(1992; R 1997) Acoustically Absorptive Materials Applied by Trowel or Spray
ASTM G 21	(1996) Determining Resistance of Synthetic Polymeric Materials to Fungi

ASSOCIATION OF WALL AND CEILING INDUSTRIES (AWCI)

AWCI 12A	Testing and Inspection of Field Sprayed Fire-Resistive Materials; An Approved Guide

UNDERWRITERS LABORATORIES INC. (UL)

UL FRD	(1998) Fire Resistance Directory

1.2 DEFINITIONS

a. "Concealed areas" are those in which there is no regular human or mechanical contact. These areas include the above dropped ceilings and areas behind permanent construction.

b. "Exposed areas" are exposed to view upon completion of construction and/or subject to frequent human or mechanical contact. That includes, but is not limited to areas where any of the following are present: physical abuse, high humidity, air erosion, or a corrosive atmosphere.

c. "Heavy abuse and deluge areas": Not applicable

1.3 SUBMITTALS

Submit the following in accordance with Section 01330, "Submittal Procedures."

1.3.1 SD-06, Test Reports

a. Spray-applied fireproofing

Submit test reports and test records from a certified independent laboratory, attesting that the fireproofing material and installation procedures conform to the requirements of the paragraphs entitled "Spray-Applied Fireproofing" and "Field Quality Control." Submit test reports to the Contracting Officer. Performance test reports shall conform to the requirements of the applicable test method.

b. Visual tests

Submit test reports for visual tests of concealed areas to the Contracting Officer.

1.3.2 SD-08, Manufacturer's Instructions

a. Manufacturer's inspection

b. Installer qualifications

1.4 MANUFACTURER'S INSPECTION

The general contractor is responsible for obtaining and submitting the manufacturer's certification of approval for the type(s) and area(s) where sprayed fire protection material is to be applied.

1.5 INSTALLER QUALIFICATIONS

Engage an experienced installer that is certified, licensed, or otherwise qualified by the spray-on fireproofing manufacturer as having the necessary experience, staff, and training to install the manufacturer's products in accordance with specified requirements. The installer engaged by the Contractor shall demonstrate 3 years of experience and a minimum of three installations with the type(s) of sprayed fire protection material specified for this project. A manufacturer's willingness to sell its products to the Contractor or installer does not infer qualification of the buyer.

1.6 DELIVERY, STORAGE, AND HANDLING

Deliver packaged materials to the job site in the original sealed packages and containers, properly marked and labeled to show manufacturer's name, brand, and certification of compliance with the requirements of

the paragraphs entitled "Fire Hazard Classification" and "Fire Resistive Rating" of this section. Keep fireproofing materials dry until ready to be used and stored off the ground, under cover, and away from damp surfaces. Damaged or opened containers shall be rejected. Apply materials with shelf-life prior to expiration of the shelf-life period.

1.7 ENVIRONMENTAL CONDITIONS

1.7.1 Temperature

Maintain substrate and ambient air temperature above 40 degrees F during application, and for 24 hours before and 24 hours after application. Maintain relative humidity within the limits recommended by the fireproofing manufacturer.

1.7.2 Ventilation

Provide adequate ventilation by natural or forced-air means at a minimum total air exchange of four times per hour during and after application until fireproofing is adequately dried.

1.8 PRE-CONSTRUCTION CONFERENCE

The Contractor shall hold a meeting for the spray-on fireproofing installer, the Contracting Officer and subcontractors (whose employees come into contact with the fireproofing) prior to the installation of any spray-on fireproofing material to discuss installation methods, patching, repair, and other issues.

1.9 PRE-INSTALLATION CONFERENCE

Hold a meeting with the Contractor, spray-on fireproofing installer, field testing agency, and manufacturer immediately prior to the application of the fireproofing. Review the substrates for acceptability, method of application, applied thickness, inspection and testing procedures, and other issues.

PART 2-PRODUCTS

2.1 SPRAY-APPLIED FIREPROOFING

2.1.1 Materials

Materials shall comply with ASTM E 1042. Materials to be used: Type I cementitious fireproofing or Type II sprayed-fiber fireproofing.

2.1.2 Physical Properties

Measure physical properties according to minimum values, unless otherwise indicated or unless higher values are required to attain a specified fire resistance rating. Measure these physical properties according to the test methods referenced with each property.

2.1.2.1 Deflection

Material shall not crack, spall, or delaminate when backing to which it is applied is subject to downward deflection 1/120 of clear span of 10 feet when tested in accordance with ASTM E 759.

2.1.2.2 Bond Impact

Material shall not crack, spall, or delaminate when tested in accordance with ASTM E 760.

2.1.2.3 Air Erosion

Dust removal shall not exceed 0.025 gram per square foot when tested in accordance with ASTM E 859.

2.1.2.4 Corrosion of Steel

Material shall not contribute to corrosion when tested in accordance with ASTM E 937.

2.1.2.5 Fire Hazard Classification

Material shall have a flame spread of 25 or less and a smoke developed rating of 50 or less when tested in accordance with ASTM E 84.

2.1.2.6 Fire Resistance Rating

The fire resistance rating for building elements shall be as indicated and shall conform to the fire rated assemblies as listed in UL FRD. Use unrestrained fire resistance ratings. Performance tests shall be in accordance with ASTM E 119.

Fire Rating Schedule

Element	Hourly Rating
Exposed Steel Columns supporting one floor	1
Exposed Steel Columns supporting more than one floor	1
Exposed Steel Columns supporting roof	1
Exposed Steel Beams	1

2.1.2.7 Resistance to Mold Growth

Resistance is to be 28 days for general application and 60 days for materials installed in air-handling plenums and shall be measured in accordance with ASTM G 21.

2.1.2.8 Bond Strength, Compressive Strength, and Dry Density

	Concealed Areas	Exposed Areas	Test No.
Bond Strength	Minimum individual bond strength of 150 lbf/ft2 minimum average bond strength of 200 lbf/ft2	Minimum bond strength of 434 lbf/ft2	ASTM E 736
Compressive Strength	Minimum compressive strength of 5.21 lbf/in.2	Minimum compressive strength of 52 lbf/in.2	ASTM E 761
Dry	Minimum of 15 pcf	Minimum of 22 pcf	ASTM E 605

Density			or AWCI 12A, Appendix A

2.2 BONDING ADHESIVE

Use adhesive where required to achieve a fire resistance rating or where recommended by the fireproofing material manufacturer.

2.3 SEALER

Use sealer where recommended by the fireproofing material manufacturer. The sealer shall be tinted to differentiate between it and the fireproofing on which it is applied. Sealer shall be fungus resistant and fire hazard classified under the paragraph entitled "Fire Hazard Classification."

2.4 WATER

Water shall be clean, fresh, potable, and free from amounts of oils, acids, alkalis, and organic matter that would be injurious to the fireproofing.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

Clean surfaces to be fireproofed by removing dirt, grease, oil, loose paint, rust and mill scale, or other contaminants that will interfere with the proper bonding. Clear above ceiling areas to be fireproofed of obstructions interfering with the application of the spray-applied fireproofing. Install support sleeves, inserts, clips, hanger attachment devices, and the like prior to the application of the fireproofing.

3.2 SURFACE ACCEPTABILITY

Surfaces that are painted or primed that are to receive spray-on fireproofing must be bond tested according to the requirements in UL FRD, "Fire Resistance Ratings - Coating Materials." Test painted steel surfaces in accordance with ASTM E 736 with the spray-applied fireproofing material. The Contractor shall certify the acceptability of surfaces to receive sprayed fireproofing. Surfaces to receive sprayed fireproofing are to be clean and in acceptable condition for application of spray-applied fireproofing.

3.3 MIXING

Mix fireproofing materials in accordance with the manufacturer's recommendations. When required mechanically control the material to water ratio. For jobs not requiring mechanical mixing, refer to manufacturer's specification for mixing.

3.4 EXTENT OF FIREPROOFING

The following areas do not receive sprayed fireproofing:

a. Underside of metal floor and roof decks.

b. Structural steel and underside of steel decks in elevator machine rooms.

c. Steel bearing members in elevator hoistways.

3.5 APPLICATION

a. Apply fireproofing material prior to the installation of ductwork, piping, and conduits. Prior to spray application, cover surfaces not to receive spray-applied fireproofing, including instruments, gages, equipment, and floor surfaces to prevent contamination by splatter, rebound, and overspray. Cover exterior openings in areas to receive spray-applied fireproofing prior to and during application of fireproofing with tarpaulins or other approved material.

b. Apply bonding adhesive and sealer for Type II materials, when not an integral part of the fireproofing material, in strict accordance with the manufacturer's recommendations. Apply adhesive to the substrate prior to applying fireproofing material. Apply fireproofing material to a thickness as required to obtain the specified fire resistance rating and to provide a fire-protective coating of uniform density and texture. Apply fireproofing in accordance with the procedure recommended by the manufacturer. Apply sealer to clean, dry fireproofed surfaces in accordance with manufacturer's recommendations.

c. The minimum average thickness shall be no less than 0.375 inch. Thicknesses cannot be less than that required to achieve designated fire resistance ratings. If the specified thickness is greater than or equal to one inch, any individual measurement cannot be less than the specified thickness minus .25 inch. If the specified thickness is less than one inch, any individual measurement cannot be less than the specified thickness minus 25 percent.

3.6 FIELD QUALITY CONTROL

3.6.1 Field Tests

3.6.1.1 Testing Agency

An independent laboratory is to be selected by the architect and paid for by the Contractor.

3.6.1.2 Extent and Testing Methodology

Testing of complete fireproofing will take place in successive stages in areas of extent described below. Do not proceed with fireproofing to the next area until the present area has been tested and passes the requirements of this section.

3.6.1.3 Size of Test Area

A test sample shall be located every 10,000 square feet of floor area or each floor, whichever produces the greatest number of test areas.

3.6.1.4 Extent of Test

Unless stated otherwise, within each test area the testing agency will select one structural member of each type (primary beam, secondary beam, joist, truss, steel deck or concrete slab, and column) and test the fireproofing.

3.6.1.5 Tests To Be Conducted

a. Thickness: The independent laboratory shall sample and verify the thickness of the fireproofing in accordance with provisions of ASTM E 605.

b. Bond Strength: Determine bond strength in accordance with ASTM E 736.

c. Density: Determine densities in accordance with ASTM E 605 or Appendix A, "Alternate Method for Density Determination" of AWCI 12A. Take density determinations at the flat portion of deck, beam bottom flange, beam web, column, and an equivalent area from the top of the lower beam flange. Areas showing a density less than specified will be rejected.

d. Compressive Strength: Determine compressive strength in accordance with ASTM E 761.

3.6.2 Visual Inspections

Inspections shall be made by the certified independent laboratory prior to closure of concealed areas. These inspections may be phased, but shall not occur less than 5 working days prior to the enclosure of the fireproofing. Conduct final inspection of sprayed areas. Inspect fireproofed surfaces after mechanical, electrical, and other work in contact with fireproofing material has been completed and before sprayed material is covered.

3.6.3 Repair and Retesting

Re-spray all test areas and any rejected areas with fireproofing material.

Rejected areas shall be retested. Re-spray areas requiring additional fireproofing material as a result of the visual inspections to provide proper thickness for the specified fire resistance rating.

3.7 CLEANUP

Clean surfaces not indicated to receive fireproofing thoroughly of sprayed material within a 24 hour period after application.

3.8 PATCHING

Patching and repairing of damaged fireproofing is the responsibility of the Contractor. The patching material shall be the same as that specified for that area.

END OF SECTION