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ACCEPTANCE CRITERIA FOR SPRAY-APPLIED AND INTUMESCENT MASTIC COATING FIRE-PROTECTION MATERIALS

AC23

Approved June 2004

Effective July 1, 2004

(Editorially revised July 2011)

Previously approved April 2002, April 2001, September 1998, January 1996, April 1994, July 1993, July 1974

PREFACE

Evaluation reports issued by ICC Evaluation Service, LLC (ICC-ES), are based upon performance features of the International family of codes and other widely adopted code families, including the Uniform Codes, the BOCA National Codes, and the SBCCI Standard Codes. Section 104.11 of the International Building Code® reads as follows:

> The provisions of this code are not intended to prevent the installation of any materials or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where the building official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety.

Similar provisions are contained in the Uniform Codes, the National Codes, and the Standard Codes.

This acceptance criteria has been issued to provide all interested parties with guidelines for demonstrating compliance with performance features of the applicable code(s) referenced in the acceptance criteria. The criteria was developed and adopted following public hearings conducted by the ICC-ES Evaluation Committee, and is effective on the date shown above. All reports issued or reissued on or after the effective date must comply with this criteria, while reports issued prior to this date may be in compliance with this criteria or with the previous edition. If the criteria is an updated version from the previous edition, a solid vertical line (|) in the margin within the criteria indicates a technical change, addition, or deletion from the previous edition. A deletion indicator (→) is provided in the margin where a paragraph has been deleted if the deletion involved a technical change. This criteria may be further revised as the need dictates.

ICC-ES may consider alternate criteria, provided the report applicant submits valid data demonstrating that the alternate criteria are at least equivalent to the criteria set forth in this document, and otherwise demonstrate compliance with the performance features of the codes. Notwithstanding that a product, material, or type or method of construction meets the requirements of the criteria set forth in this document, or that it can be demonstrated that valid alternate criteria are equivalent to the criteria in this document and otherwise demonstrate compliance with the performance features of the codes, ICC-ES retains the right to refuse to issue or renew an evaluation report, if the product, material, or type or method of construction is such that either unusual care with its installation or use must be exercised for satisfactory performance, or if malfunctioning is apt to cause unreasonable property damage or personal injury or sickness relative to the benefits to be achieved by the use of the product, material, or type or method of construction.

Acceptance criteria are developed for use solely by ICC-ES for purpose of issuing ICC-ES evaluation reports.

ACCEPTANCE CRITERIA FOR SPRAY-APPLIED AND INTUMESCENT MASTIC COATING FIRE-PROTECTION MATERIALS (AC23)

1.0 INTRODUCTION

1.1 Purpose: The purpose of this acceptance criteria is to establish minimum requirements for recognition of spray-applied fire-protection materials, including intumescent coatings, in ICC Evaluation Service, LLC (ICC-ES), evaluation reports under the 2009 and 2006 *International Building Code*® (IBC), the 2009 and 2006 *International Mechanical Code*® (IMC), the BOCA® *National Building Code*/1999 (BNBC), the 1998 *International Mechanical Code*® (1998 IMC), the 1999 *Standard Building Code*© (SBC), the 1997 *Standard Mechanical Code*© (SMC), the 1997 *Uniform Building Code*™ (UBC) and the 1997 ICBO *Uniform Mechanical Code* (ICBO UMC).

The reason for development of this criteria is to provide guidelines for evaluating spray-applied and intumescent mastic coating fire-protection materials since the codes do not provide a method of evaluation.

1.2 Scope: This acceptance criteria is limited to spray-applied fire-protection materials, including intumescent mastic coatings.

1.3 Codes and Referenced Standards: Where standards are referenced in this criteria, these standards shall be applied consistently with the code upon which compliance is based. Standard editions applicable to each code are summarized in Table 1.

1.3.1 2009 and 2006 *International Building Code*® (IBC), International Code Council.

1.3.2 2009 and 2006 *International Mechanical Code*® (IMC), International Code Council.

1.3.3 BOCA® *National Building Code*/1999 (BNBC).

1.3.4 1998 *International Mechanical Code*® (1998 IMC).

1.3.5 1999 *Standard Building Code*® (SBC).

1.3.6 1997 *Standard Mechanical Code*® (SMC).

1.3.7 1997 *Uniform Building Code*™ (UBC).

1.3.8 1997 ICBO *Uniform Mechanical Code* (UMC).

1.3.9 ASTM E 84, Test Method for Surface Burning Characteristics of Building Materials, ASTM International.

1.3.10 ASTM B 117-03, Practice for Operating Salt Spray (Fog) Apparatus, ASTM International.

1.3.11 ASTM E 119 Standard Test Methods for Fire Tests of Building Construction and Materials, ASTM International.

1.3.12 ASTM E 605, Test Method for Thickness and Density of Sprayed Fire-Resistive Materials Applied to Structural Members, ASTM International.

1.3.13 ASTM E 736-00 (2006), Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members, ASTM International.

1.3.14 ASTM E 759 (2000), Test Method for Effect of Deflection of Sprayed Fire-Resistive Material Applied to Structural Members, ASTM International.

1.3.15 ASTM E 760-92 (2000)$^{\varepsilon 1}$, Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members, ASTM International.

1.3.16 ASTM E 761-92 (2000), Test Method for Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members, ASTM International.

1.3.17 ASTM E 859-93 (2000), Test Method for Air Erosion of Sprayed Fire-Resistive Materials Applied to Structural Members, ASTM International.

1.3.18 ASTM G 21-96 (2002), Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi, ASTM International.

1.3.19 Technical Manual 12-B-98 (First Edition), Standard Practice for the Testing and Inspection of Field Applied Thin-film Intumescent Fire-resistive Materials: An Annotated Guide, Association of the Wall and Ceiling Industries—International (AWCI).

1.3.20 UL 263-03, Standard for Fire Test of Building Construction Materials, Underwriters Laboratories Inc.

1.3.21 UL 723-03, Standard for Test for Surface Burning Characteristics of Building Materials—with Revisions through May 2005, Underwriters Laboratories Inc.

1.4 Definitions:

1.4.1 Sprayed Fire-resistant Materials: Materials, typically containing binders, aggregates and fibers, that are mixed and/or sprayed with water to provide fire resistance to structural steel members.

1.4.2 Intumescent Mastic Coating: Paint-like coatings that are applied to provide fire-resistant protection to structural steel members at thicknesses not greater than 660 mils (16.8 mm).

2.0 BASIC INFORMATION

2.1 General: The following information shall be submitted:

2.1.1 Product Description: Complete information concerning material specifications, thickness, size and the manufacturing process.

2.1.2 Application Instructions: Instructions shall include the following items:

1. Application/installation details for the coating that are necessary to achieve the fire-resistant rating.
2. Details of the surface preparation of the steel.
3. Minimum ambient temperature before and after application until cured.
4. Product handling and storage requirements.
5. Restrictions or limitations on use.

2.1.3 Packaging and Identification: A description of the field identification of the fire-protection materials shall be submitted. Identification provisions shall include the evaluation report holder's name and address, the evaluation report number and the name of the product.

2.1.4 Field Preparation: A description of the methods of application and finishing.

2.2 Testing Laboratories: Testing laboratories shall comply with Section 2.0 of the ICC-ES Acceptance Criteria for Test Reports (AC85) and Section 4.2 of the ICC-ES Rules of Procedure for Evaluation Reports.

2.3 Test Reports: Test reports shall comply with AC85.

2.4 Product Sampling: Products shall be sampled in accordance with Section 3.2 of AC85.

3.0 TEST AND PERFORMANCE REQUIREMENTS

The following data shall be submitted, except as noted otherwise in this criteria:

3.1 Fire Resistance Testing: Testing shall comply with ASTM E 119. Specimens shall be representative of those used in actual construction. Before fire testing, the thickness and density of the fire-protection material shall be determined using the methods prescribed in ASTM E 605, and the thickness of the intumescent mastic coating shall be determined using the methods prescribed in AWCI Technical Manual 12-B.

3.2 Physical Property Tests: The in-place serviceability/physical property tests in this section shall be performed on spray-applied fire-protection materials other than intumescent mastic coatings. The fire-protection material shall be a minimum of $^3/_4$ inch (19.1 mm) thick and shall have a density that is within 10 percent of the minimum average value specified in the evaluation report.

3.2.1 Tensile Bond: Testing shall be in accordance with ASTM E 736.

Conditions of Acceptance: Adhesion/cohesion shall be at least 20 times the weight of the in-place material or 150 psf (7.2 kN/m^2), whichever is greater.

3.2.2 Steel Deck Deflection: Testing shall be in accordance with ASTM E 759.

Conditions of Acceptance: The test samples shall display no cracking, spalling or delamination of the in-place material that is visible to the naked eye.

3.2.3 Impact Resistance: Testing shall be in accordance with ASTM E 760.

Conditions of Acceptance: The test samples shall display no cracking, spalling or delamination of the in-place material that is visible to the naked eye.

3.2.4 Compressive Strength: Testing shall be in accordance with ASTM E 761.

Conditions of Acceptance: Compressive strength shall be at least 750 psf (35.9 kN/m^2).

3.2.5 Air-stream Resistance: Air-stream resistance testing conducted in accordance with ASTM E 859 shall be performed on spray-applied fire-protection materials other than intumescent mastic coatings. In areas of a building such as elevator shafts, where the minimum air velocity is anticipated to exceed 1,200 fpm (366 m/min), the exposed fire-protection material shall be subjected to a velocity of the air stream of not less than 2,500 feet per minute (762 m/min), for the full 24-hour test period. In plenums and ventilation shafts the exposed fire-protection materials shall be subjected to twice the maximum allowed velocity of the air flow stream, for the full 24-hour test period.

Conditions of Acceptance: Material removed shall not exceed 0.025 gram per square foot of sample area in 24 hours.

3.2.6 Mold Growth and Humidity Resistance (Optional): If recognition is sought for installation of spray-applied fire-resistive materials within plenums under the ICBO UMC, then testing in accordance with ASTM G 21 is required.

Conditions of Acceptance: The test specimens shall have a rating of zero as defined in Section 9.3 of ASTM G 21.

3.3 Flame Spread and Smoke Density: Testing shall be in accordance with ASTM E 84 or UL 723.

Conditions of Acceptance: For interior exposure, flame-spread and smoke-density indices shall not exceed 200 and 450, respectively, for a Class C finish. Recognition in air plenums requires flame-spread and smoke-density indices not exceeding 25 and 50, respectively.

3.4 Environmental Exposure: Spray-applied fire-protection materials recognized for use in areas classified as weather-exposed surfaces under Section 202 of the IBC and Section 224 of the UBC shall be subjected to the simulated environmental exposure conditions specified in this section. Intumescent mastic coatings used in interior locations shall be subjected to simulated environmental exposure conditions except for salt-spray; combination wet, freeze, and dry cycling; and weatherometer testing. The salt-spray; combination wet, freeze, and dry cycling; and weatherometer tests shall be included for exterior recognition. The protective material on control specimens shall be of sufficient thickness so that, when exposed to the temperatures of the standard time–temperature curve described in ASTM E 119, the time that it takes for the steel to reach an average temperature of 1000°F (538°C) with no individual thermocouple indicating a temperature greater than 1200°F (649°C), is between 45 and 75 minutes after the beginning of fire testing. The location of the four thermocouples is shown in Figure 1. The fire-exposure time period between 45 and 75 minutes is defined as the control period. The fire-protection material thickness established for the control period shall be applied to conditioned specimens that are subjected to simulated environmental exposure conditions.

3.4.1 Control Specimens: Spray-applied, fire-protection material is applied to two 6-by-6-by-$^3/_{16}$-inch (152 by 152 by 4.8 mm), 2-foot-long (610 mm) tube columns. The material shall be conditioned to a constant weight at a temperature of 73°F ± 5°F (23°C ± 2.7°C) and at a relative humidity of 50±5 percent. These samples are used as the controls against which the conditioned specimens are compared after fire testing.

3.4.2 Conditioned Specimens: Spray-applied fire-protection material is applied to columns to the same thickness and density as the control specimens, and shall be conditioned as follows:

3.4.2.1 Aging: One 6-by-6-by-$^3/_{16}$-inch (152 by 152 by 4.8 mm), 2-foot-long (610 mm) tube column shall be placed in a circulating-air oven at 158°F ± 5°F(70°C ± 2.7°C) for 270 days or at 176°F ± 5°F (80°C ± 2.7°C) for a period of 135 days.

3.4.2.2 High Humidity: One 6-by-6-by-$^3/_{16}$-inch (152 by 152 by 4.8 mm), 2-foot-long (610 mm) tube column shall be exposed to a controlled humidity maintained at 98 ± 2 percent and to a temperature of 95°F ± 3°F (35°C ± 1.7°C) for 180 days.

3.4.2.3 Industrial Atmosphere (CO2-SO2 Air Mixture): One 6-by-6-by-$^3/_{16}$-inch (152 by 152 by 4.8 mm), 2-foot-long (610 mm) tube column shall be exposed to an amount of sulphur dioxide equivalent to 1 percent of the volume of the test chamber, and an equal volume of carbon dioxide, at 95°F ± 3°F (35°C ± 1.7°C), with a small amount of water maintained at the bottom of the chamber. This sample is exposed for 30 days.

3.4.2.4 Salt Spray: One 6-by-6-by-$^3/_{16}$-inch (152 by 152 by 4.8 mm), 2-foot-long (610 mm) tube column covered with fire-protection material shall be exposed to salt spray for 90 days in accordance with ASTM B 117.

3.4.2.5 Combination Wet, Freeze and Dry Cycling: One 6-by-6-by-$^3/_{16}$-inch (152 by 152 by 4.8 mm), 2-foot-long (610 mm) tube column covered with fire-protection material shall be exposed to a cycle consisting of 0.7 inch (17.78 mm) of water per hour for 72 hours, air at a temperature of -40°F ± 5°F (-40°C ± 2.7°C) for 24 hours, and a dry atmosphere at a temperature of 140°C ± 5°C (60°C ± 2.7°C) for 72 hours, for 12 cycles.

3.4.2.6 Weatherometer: Two samples of fire-protection material applied to $^1/_8$-inch-thick (1.2 mm) steel plates measuring 3 inches by 5 inches (76 mm by 127 mm) shall be exposed to ultraviolet light and water by mounting the samples vertically on the inside of a cylinder that measures 30 inches (762 mm) in diameter and 18 inches (457 mm) high, and that has two $^1/_2$-inch-diameter (12.7 mm) enclosed carbon electrodes located in the center of the cylinder. The cylinder revolves at the rate of one revolution per minute, exposing the sample to a water spray. During each 20-minute cycle, samples are exposed to water spray and light for 3 minutes and to light only for 17 minutes. The cycle is repeated for 720 hours. See ASTM G 23 for details.

3.4.2.7 Chlorine: Intumescent, mastic coatings recognized for interior or exterior applications are applied to one 6-by-6-by-$^3/_{16}$-inch (152 by 152 by 4.8 mm), 2-foot-long (610 mm) tube column, and shall be exposed to an atmosphere of water vapor, air, and chlorine at a concentration of 5 ppm. The temperature shall be maintained at 95°F ± 3°F (35°C ± 1.7°C) for a period of 180 days.

3.4.3 Conditions of Acceptance:

3.4.3.1 The fire-protection material on the conditioned specimens exposed to the tests in Section 3.4.2 shall exhibit no evidence of delamination.

3.4.3.2 The conditioned specimens exposed to the tests in Sections 3.4.2.1 to 3.4.2.7 shall perform comparably to the control specimens when exposed to the temperatures of the standard time–temperature curve described in UBC Standard 7-1, ASTM E 119 or UL 263. Comparable performance occurs when the average thermocouple temperature of the conditioned specimens does not exceed 1000°F (538°C) and no individual thermocouple indicates a temperature greater than 1200°F (649°C) within a time that differs from the control period by no more than 15 percent.

4.0 QUALITY CONTROL

4.1 Quality documentation complying with the ICC-ES Acceptance Criteria for Quality Documentation (AC10) shall be submitted.

4.2 Third-party follow-up inspections are not required under this acceptance criteria.

5.0 EVALUATION REPORT RECOGNITION

5.1 Fire Resistance: Results of fire-resistance testing shall be specified in the evaluation report. Part I of UBC Standard 7-7 or Sections 721.5.1.3 and 721.5.2.2 of the IBC (calculating fire resistance) does not apply to intumescent, mastic, fire-protection materials. Material thickness is recognized for fire-resistive ratings of one, one and a half, two, three or four hours. Fire-protection materials, except for intumescent mastic coatings, are reported as a total thickness in minimum increments of $^1/_8$ inch (3.2 mm).

5.2 Density: Density of fire-protection materials, in fire-performance testing, excepting intumescent mastic coatings, shall be specified in the evaluation report as minimum average and minimum individual values.

5.3 Primed or Painted Steel: With the exception of intumescent mastic coatings, the evaluation report may recognize spray-applied, fire-resistive material applied to wide-flange steel shapes having an unknown primed or painted surface, under the following conditions:

5.3.1 The beam flange width does not exceed 12 inches (305 mm).

5.3.2 The column flange width does not exceed 16 inches (406 mm).

5.3.3 The beam or column web depth does not exceed 16 inches (406 mm).

5.3.4 Bond tests, conducted at the jobsite in accordance with ASTM E 736, shall verify the bond strength of the fire-protection material to the unknown primed or painted steel surfaces. The minimum average bond strength shall be 80 percent, and the minimum individual bond strength shall be 50 percent of the bond strength of the material applied to a clean, bare, smooth, $^1/_8$-inch-thick (3.2 mm) steel plate. The average and minimum individual bond strengths shall be determined using five bond-strength tests.

5.3.5 The evaluation report shall permit a bonding agent to be applied to the unknown primed or painted steel to obtain the minimum required bond strengths when the results of field tests described in Section 5.3.4 are below the required minimum values. The bond-strength tests shall be repeated when there is a bonding agent.

5.3.6 Any dimension limits specified in Section 5.3.1, 5.3.2 or 5.3.3 and in the evaluation report that are not met at the jobsite require a mechanical break. A mechanical break consists of one or more minimum 1.7-pound-per-square-yard (0.65 kg/m^2) metal lath strips, or No. 20 SWG galvanized hexagonal wire mesh mechanically fastened to the flange or web either by weld, screw or power-actuated fastener. Fasteners are spaced a maximum of 12 inches (305 mm) on center, on each longitudinal edge of the strip,

so that the clear spans do not exceed the limits established in conditions specified in Section 5.3.1, 5.3.2 or 5.3.3. At least 25 percent of the width of the oversized flange or web element shall be covered by the metal lath. Minimum metal lath width shall be $3^1/_2$ inches (89 mm).

5.3.7 The evaluation report may specify dimensions exceeding the limits in Sections 5.3.1, 5.3.2 and 5.3.3, provided fire tests are conducted in accordance with UBC Standard 7-1, ASTM E 119 or UL 263 on structural steel members primed with a primer or paint incompatible with the fire-protection material. Incompatibility exists when there is a zero bond condition between the fire-protection material and the steel surface of the test specimens. The effects of zero bond/adhesion on the ability of the fire-protection material, applied to greater expanses of flat steel surfaces than specified in Sections 5.3.1, 5.3.2 and 5.3.3, to remain in place during full-scale fire exposures are determined by the following procedure:

5.3.7.1 Two full-scale fire-endurance tests shall be conducted on columns that have dimensions exceeding those specified in Sections 5.3.2 and 5.3.3, and that are covered with an incompatible primer or paint. The specimens are protected with two thicknesses of fire-protection material applicable to columns with dimensions exceeding those specified in Sections 5.3.2 and 5.3.3.

5.3.7.2 Two full-scale fire-endurance tests shall be conducted on loaded beams that have dimensions greater than those specified in Sections 5.3.1 and 5.3.3, and that are covered with an incompatible paint or primer. The specimens are protected with two thicknesses of fire-protection material applicable to beams with dimensions exceeding those specified in Sections 5.3.1 and 5.3.3.

5.3.7.3 Fire tests are conducted in accordance with UBC Standard 7-1 (UBC), ASTM E 119 (IBC, BNBC, SBC) or UL 263 (IBC) for a minimum of 60 minutes. Before the fire tests are conducted, average density and bond strength shall be determined for separate test specimens in accordance with ASTM E 605 and ASTM E 736, respectively. The bond strength shall be negligible and there shall be no evidence of delamination from column or beam surfaces. For recognition under the BNBC, the density shall not be less than the density specified in the approved fire-resistance design or 15 pounds per cubic feet (240 kg/m3), whichever is greater.

5.3.7.4 The column or beam test assembly during the fire-endurance testing shall exhibit no delamination or fall-off of the fire-protection material. The minimum and maximum thicknesses tested will be the limiting thicknesses in the evaluation report.

5.3.7.5 The evaluation report shall list changes to the limits specified in Sections 5.3.1, 5.3.2 and 5.3.3 based on the maximum dimensions tested in accordance with Sections 5.3.7.2 and 5.3.7.4. Bond tests specified in Section 5.3.4 are required for the evaluation report in all cases. For dimensions exceeding the limits specified, a mechanical break as specified in Section 5.3.4 is required. A minimum of 25 percent of the portion of the width of the flange or web element that exceeds the limits specified in the evaluation report shall be covered with the metal lath. The minimum metal lath width shall be $3^1/_2$ inches (89 mm).

5.3.8 If the condition in Section 5.3.4 is not met at the jobsite, a mechanical bond shall be provided and shall consist of minimum 1.7-pound-per-square-yard (0.65 kg/m^2) expanded metal lath or No. 20 SWG galvanized hexagonal wire mesh wrapped around the structural member.

5.3.9 A known primer or paint may be recognized in an evaluation report as compatible with the spray-applied, fire-protection material, provided bond strength tests conducted in accordance with Section 5.3.4 are provided. The evaluation report will recognize the paint or primer as compatible with the fire-protection material and specify conditions listed in Sections 5.3.1, 5.3.2 and 5.3.3.

5.4 Thickness Tolerance: The thickness tolerances for fire-protection materials, excepting intumescent mastic coatings, are as follows:

5.4.1 Minus Tolerance: The thickness must be corrected by applying additional material where the calculated average thickness is less than that required by the recognized design, or where an individual measured thickness reading has a minus tolerance greater than $^1/_4$ inch (6.4 mm) or more than 25 percent for a design thickness of less than 1 inch (25.4 mm).

5.4.2 Positive Tolerance: An individual measured thickness that exceeds the thickness specified in a design by $^1/_4$ inch (6.4 mm) or more must be recorded as the thickness specified in the design plus $^1/_4$ inch (6.4 mm).

5.5 Physical Protection:

5.5.1 General: For exposed fire-protection materials on beams, columns, ceilings, or other structural shapes less than 8 feet (2438 mm) above any floor, landing, or occupied space, the material shall have the following minimum performance values:

5.5.1.1 A minimum bond strength of 7,000 psf (335.3 kN/m^2) when tested in accordance with ASTM E 736.

5.5.1.2 A minimum compressive strength of 50,000 psf (2395 kN/m^2) when tested in accordance with ASTM E 761.

5.5.1.3 A minimum density of 35 pcf (560.6 kg/m^3) when tested in accordance with ASTM E 605.

5.5.2 Affected Locations: For exposed fire-protection materials on structural steel members less than 8 feet (2438 mm) from a floor, landing, or occupied space, the structural steel shall be protected with fire-resistive material having the minimum physical properties specified in Section 5.5.1.

EXCEPTION: Columns or vertical members shall be protected to a height of 8 feet (2438 mm).

If the material does not meet the minimum physical property requirements specified in Section 5.5.1, the exposed structural steel element and fire-protection material shall be protected with a material that is not supported by the sprayed-applied fire-protection material, such as furred wallboard, concrete or cement plaster with lath, or a similar construction approved by the building official.

5.6 Surface-burning Characteristics: The flame-spread and smoke-density ratings shall be specified in the evaluation report.

5.7 Installation within Plenums: The evaluation report may recognize the installation of spray-applied fire-resistive materials within plenums, provided the materials have a mold-, humidity-, and erosion-resistance that meets the requirements specified in Sections 3.2.5 and 3.2.6 of this acceptance criteria. Additionally, the materials shall have a flame-spread rating of not more than 25 and a smoke-density rating of not more than 50, when tested in accordance with Section 3.3 of this acceptance criteria, and as required by IMC Section 602.2.1, SMC Section 609, and UMC Section 601.4.

5.8 Special inspections shall be provided in accordance with Sections 1704.12 and 1704.13 of the 2009 IBC (Sections 1704.10 and 1704.11 of the 2006 IBC), Section and 1705.12 of the BNBC, Section 1709 of the SBC and Section 1701.4 of the UBC.■

TABLE 1—REFERENCED STANDARDS

STANDARD	DATE OF STANDARD				
	2009 IBC	2006 IBC	BNBC	UBC	SBC
ASTM E 84	2007	2004	$98^{\varepsilon 1}$	84	95
ASTM E 119	2007	2000	98	93	95a
ASTM E 605	93 (2006)	2000	93 (1996)	93 (1996)	77

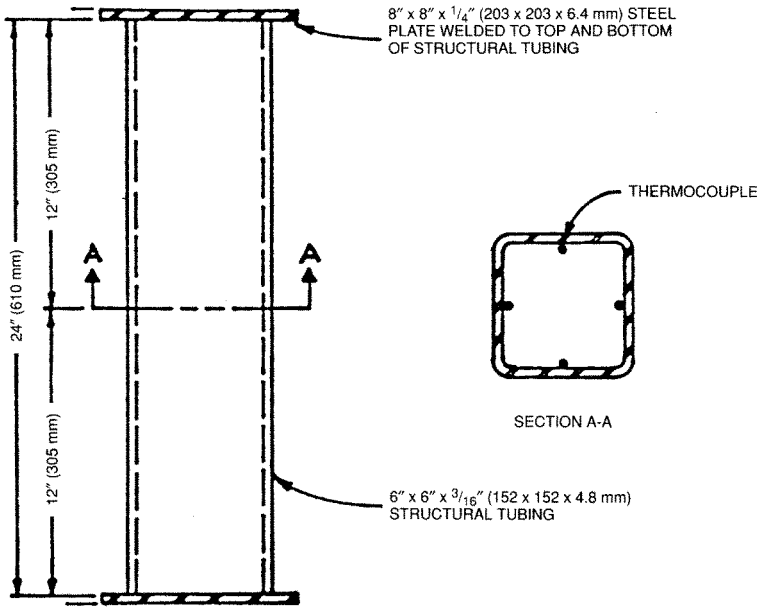

FIGURE 1—LOCATION OF THE FOUR THERMOCOUPLES REQUIRED ON THE SMALL-SCALE COLUMNS FOR THE ENVIRONMENTAL EXPOSURE TESTING