ACCEPTANCE CRITERIA FOR RAISED FLOOR SYSTEMS OVER CONCEALED SPACES

AC175

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PREFACE

Evaluation reports issued by ICC Evaluation Service, Inc. (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 FOR RAISED FLOOR SYSTEMS OVER CONCEALED SPACES

1.0 INTRODUCTION

1.1 Purpose: The purpose of this acceptance criteria is to establish requirements for ICC-ES recognition of low-profile, raised floor systems under the 1997 *Uniform Building Code*™ (UBC) and the 2003 *International Building Code*® (IBC).

1.2 Scope: The low-profile, raised floor systems are placed directly on, and are wholly supported by, a structural floor assembly complying with the applicable code. The primary function of the low-profile, raised floor system is to provide a nonplenum space for distribution of power, voice or data cabling to work stations. Class A, low-profile, raised floor systems, as defined in this criteria, may be placed where open spaces below the flooring do not exceed 3,000 square feet (279 m^2) when data required in accordance with Sections 3.1 and 3.3 of this criteria is provided. Class B, low-profile, raised floor systems, as defined in this criteria, may be placed where open spaces below the flooring do not exceed 100 square feet (9.3 m^2), when data required in accordance with Sections 3.2 and 3.3 of this criteria is provided. Conditions of use for each class are described in Section 6.0.

1.3 Referenced Documents:

1.3.1 Acceptance Criteria for Adhesives (AC05).

1.3.2 Acceptance Criteria for Quality Control Manuals (AC10).

1.3.3 Acceptance Criteria for Test Reports and Product Sampling (AC85).

1.3.4 Acceptance Criteria for Laboratory Accreditation (AC89).

1.3.5 2003 *International Building Code*® (IBC), International Code Council.

1.3.6 1997 *Uniform Building Code*™ (UBC).

1.3.7 ASTM D 635-98, Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position, American Society for Testing and Materials.

1.3.8 ASTM D 1929-96 (2000)$^{\varepsilon 01}$, Standard Test Method for Determining Ignition Temperature of Plastics, American Society for Testing and Materials.

1.3.9 ASTM D 2843-99, Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics, American Society for Testing and Materials.

1.3.10 ASTM E 84-01, Standard Test Method for Surface burning Characteristics of Building Materials, American Society for Testing and Materials.

1.3.11 ASTM E 136-99$^{\varepsilon 01}$, Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C, American Society for Testing and Materials.

1.3.12 ASTM E 1354-99, Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter, American Society for Testing and Materials.

1.3.13 Recommended Test Procedures for Access Floors, 1991, Ceilings and Interior Systems Construction Association (CISCA).

1.3.14 2002 NFPA 70, *National Electrical Code*, National Fire Protection Association.

1.3.15 Under Floor Fire Test for Low-profile Raised Floor Systems, Annex 1.

1.3.16 Top of Floor Fire Test for Low-profile, Raised Floor Systems, Annex 2.

1.4 Definitions:

1.4.1 Low-profile, Raised Floor System: A low-profile, raised floor system is an assembly consisting of panels mounted on a base supporting structure, including pedestals, to provide shallow concealed floor space not exceeding 4 inches (100 mm) in total depth measured from support floor surface to top of floor panel. The concealed underfloor space can be utilized for the installation of electrical, communication or similar systems. Space under raised floor systems shall not be used as an air-supply or return-air plenum. The raised floor system is not a structural component of the support floor construction.

1.4.2 Class A: Maximum area of undivided concealed space is 3,000 square feet (279 m^2):

1.4.3 Class B: Maximum area of undivided concealed space is 100 square feet (9.3 m^2):

1.4.4 Composite Floor Panels and Ramps: Floor panels or ramps produced with two or more distinct parts.

2.0 BASIC INFORMATION

2.1 General: The following information is required for both classes.

2.1.1 Product Description: Complete details concerning components, material specifications, and the manufacturing processes.

2.1.2 Installation Instructions: Dimensioned, scaled drawings and installation details, noting installation requirements and limitations. A copy of the installation instructions packaged with the product shall be submitted.

2.1.3 Packaging and Identification: A description is required of the method of packaging and identifying floor panel, pedestal, and accessory components. Identification shall occur on system components or packaging and include the manufacturer, the evaluation report number, the name or logo of the inspection agency, and notice of any product installation limitations.

2.1.4 Field Preparation: A description of the methods of field cutting, trimming, forming, site staging and preparation.

3.0 REQUIRED DATA

3.1 Class A:

3.1.1 Fire Hazard:

3.1.1.1 Plastic: Plastic used in the system shall comply as Class CC1 approved plastic, as defined in Section 217 of the UBC, or Section 2602.1 and 2606.4 of

the IBC, based on successful testing in accordance with UBC Standards 8-1, 26-5, 26-6 and 26-7 (UBC) or ASTM D 635, ASTM D 1929, ASTM D 2843 and ASTM E 84 (IBC).

3.1.1.2 Wood in Ramps and Trim: Wood and wood-based materials that are not part of a composite panel and are used for ramps and trim shall comply with the fire-retardant-treated wood requirements noted in (1) UBC Section 207; or (2) IBC Section 2303.2.

3.1.1.3 Composite Floor Panels and Ramps:

3.1.1.3.1 Steel: Steel used in the construction of the composite floor panels and ramps shall be a minimum No. 30 gage, [0.016 inch (0.41 mm)] Type B, hot-dipped galvanized, commercial steel complying with ASTM A 653, with a minimum yield strength of 30 ksi (205 MPa).

3.1.1.3.2 The composite floor panels and ramps shall:

1. Be noncombustible as defined by Section 215 of the UBC; or Section 703.4 of the IBC; or

2. Have a flame-spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with UBC Standard 8-1 (UBC) or ASTM E 84 (IBC). The test sample shall consist of composite panels that have a cut edge on its leading edge (i.e., cut edge placed toward the burners) placed transverse to the length of the test apparatus approximately every 2 feet (610 mm) for the length of the test apparatus.

3.1.1.4 Perimeter Blocking: Noncombustible fire blocking shall be installed along the perimeter of low-profile raised floor installations at penetrations or abutting vertical elements.

3.1.2 Comparative Analysis: A comparative analysis of the results of tests conducted in accordance with ASTM E 1354 shall be performed.

3.1.2.1 The ASTM E 1354 testing shall be conducted using the edge frame in a horizontal orientation, with the spark igniter on and an incident heat flux of 50 kw/m^2.

3.1.2.2 The test samples shall consist of 1) three samples of the low-profile, raised floor system, and 2) three samples of a “wood-sleepers” used in flooring applications as permitted in the UBC and IBC.

3.1.2.3 Conditions of Acceptance: The mean value for the total heat release per unit area (MJ/m^2) for the low-profile, raised floor system samples shall be equal to or less than the mean value (MJ/m^2) obtained for the “wood-sleeper” samples.

3.1.3 Under Floor Fire Testing: The low-profile, raised floor system shall be tested in accordance with the Under Floor Fire Test for Low – profile, Raised Floor Systems, Annex 1 and meet the conditions of acceptance.

3.1.3.1 The low-profile, raised floor system shall be limited in height to that tested up to 4 inches (100 mm).

3.1.3.2 If the raised floor system is to be applied to a floor-ceiling assembly that has a combustible top surface, then the test must be conducted with plywood as the top surface of the supporting floor.

3.1.4 Top of Floor Fire Testing: The Low-profile, raised floor system shall meet be tested in accordance with Top of Floor Test for Low-profile, Raised Floor systems, Annex 2 and meet the Conditions of Acceptance.

3.1.4.1 The low-profile, raised floor system shall be limited in height to that tested up to 4 inches (100 mm).

3.2 Class B:

3.2.1 Fire Hazard:

3.2.1.1 Plastic: Plastic used in any component of the system shall comply as Class CC1 approved plastic, as defined in section 217 of the UBC or Section 2602.1 and 2606.4 of the IBC, based on successful testing in accordance with UBC Standards 26-5, 26-6 and 26-7 (UBC) or ASTM E 635, ASTM D 1929, ASTM D 2843 and ASTM E 84 (IBC).

3.2.1.2 Wood for Ramps and Trim: Wood and wood-based materials that are not part of a composite panel and are used for ramps and trim shall comply with the fire-retardant-treated wood requirements noted in (1) UBC Section 207, based on successful testing in accordance with UBC Standard 8-1; or (2) IBC Section 2303.2, based on successful testing in accordance with ASTM E 84.

3.2.1.3 Composite Floor Panels and Ramps:

3.2.1.3.1 Steel: Steel used in the construction of the composite floor panels and ramps shall be a minimum No. 30 gage, [0.016 inch (0.41 mm)] Type B, hot-dipped galvanized, commercial steel complying with ASTM A 653, with a minimum yield strength of 30 ksi (205 MPa).

3.2.1.3.2 The composite floor panels and ramps shall:

1. Be noncombustible as defined by Section 215 of the UBC; or Section 703.4 of the IBC; or

2. Have a flame-spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with UBC Standard 8-1 (UBC) or ASTM E 84 (IBC). The test sample shall consist of composite panels that have a cut edge on its leading edge (i.e., cut edge placed toward the burners) placed transverse to the length of the test apparatus approximately every 2 feet (610 mm) for the length of the test apparatus.

3.2.1.4 Perimeter Blocking: Noncombustible fire blocking shall be installed along the perimeter of low-profile raised floor installations at penetrations or abutting vertical elements.

3.2.2 Comparative Analysis: A comparative analysis of the results of tests conducted in accordance with ASTM E 1354 shall be performed.

3.2.2.1 The ASTM E 1354 testing shall be conducted using the edge frame in a horizontal orientation, with the spark igniter on and an incident heat flux of 50 kw/m^2.

3.2.2.2 The test samples shall consist of 1) three samples of the low-profile, raised floor system used under the floor panels and 2) three samples of “wood-sleepers” used in flooring applications as permitted in the UBC and IBC.

3.2.2.3 The mean value for the total heat release per unit area (MJ/m^2) for the low-profile, raised floor system samples shall be equal to or less than the mean value (MJ/m^2) obtained for the “wood-sleeper” samples.

3.3 Structural Considerations—Class A and Class B:

3.3.1 Requirements: Low-profile, raised floor systems shall be capable of supporting uniform and concentrated loads as set forth in Table 16-A of the UBC or Table 1607.1 of the IBC, for access floor systems, and as set forth in Item 2 of Section 2312.1 of the UBC, for systems subjected to concentrated loads.

3.3.2 Test Procedures: Testing is required, as set forth in the CISCA Recommended Test Procedures for Access Floors. In addition, an ultimate uniform load test is required, based on Section II of the CISCA test procedure, modified by applying a uniform load over the entire panel. Test panel specimens shall be supported in a manner representative of recommended installation.

3.3.3 Conditions of Acceptance: Panels shall deflect no more than $^1/_{360}$ of span under loads required by the UBC or IBC. The average minimum ultimate load shall be five times the loads required in the UBC or IBC.

4.0 EVALUATION REPORT RECOGNITION

The evaluation report shall include a description of the system, allowable loads, installation requirements and limitations, identification, and the following conditions:

1. All buildings in which low-profile, raised floor systems are installed shall be fully sprinklered in accordance with Chapter 9 of the UBC or IBC.

2. The overall height of the low-profile, raised floor system, including panel supports, shall not exceed 4 inches (100 mm) in total.

3. The area below the raised-floor system shall not be used for storage purposes.

4. Fire-resistive walls shall extend through the low-profile, raised floor system to the fire-resistive floor/ceiling assembly below. Penetrations through the walls shall be protected by an approved fire-stop system.

5. Air-conveying ducts shall not be located in the concealed space created by the low-profile raised floor system.

6. The area below the low-profile, raised floor system shall not be used as a plenum.

7a. Class A only: The concealed space created by the low-profile, raised floor system shall be separated into maximum 3,000-square-foot (279 m^2) areas by use of noncombustible fire blocks. Examples of noncombustible fire blocking include, but are not limited to, minimum $^1/_2$-inch-thick (12.7 mm) gypsum board and minimum No. 22 gage [0.0359 inch (0.91 mm) uncoated base-metal thickness] ferrous metal or approved ceramic mineral wool boards.

7b. Class B only: The concealed space created by the low-profile, raised floor system shall be separated into maximum 100-square-foot (9.3 m^2) areas by use of noncombustible fire blocking. Examples of noncombustible fire blocking include, but do not exclude other approved materials or methods, minimum $^1/_2$-inch-thick (12.7 mm) gypsum board and minimum No. 22 gage [0.0359 inch (0.91 mm) uncoated base-metal thickness] ferrous metal or approved ceramic mineral wool boards.

8. Electrical wiring methods permitted below the raised floor system are in compliance with Section 645-5(d) of the NFPA 70, *National Electrical Code*.

9. The raised floor systems are in contact with and supported directly on and wholly supported by existing floor-ceiling assemblies. When the supporting floor-ceiling assembly is required to be fire-resistive, the low-profile raised floor system is permitted to be installed on top of the assembly. When the supporting floor-ceiling assembly is required to be of noncombustible construction, the top surface of the supporting assembly shall contain surfacing with flame-spread index rating not exceeding 25 and smoke-developed index not exceeding 50. Prior to the installation of the low-profile, raised floor system, existing floor coverings and adhesives shall be substantially removed.

5.0 QUALITY CONTROL

5.1 The products shall be manufactured under an approved quality control program with inspections by an inspection agency accredited by the International Accreditation Service (IAS) or otherwise acceptable to ICC-ES.

5.2 A quality control manual complying with the ICC-ES Acceptance Criteria for Quality Control Manuals (AC10) shall be submitted.■

ANNEX 1
Under-floor Fire Test for Raised Floor Systems Exposed to a Simulated Electrical Cabling Fire Exposure

A1–1.0 INTRODUCTION

The fixed height, raised floor system is defined in Section A1–3.0 and is comprised of floor panels supported on a grid support system secured to a base-floor surface, forming a concealed space. The raised floor system is not a structural component of the floor construction.

This test assesses the properties of a nonplenum, low-profile, raised floor system exposed to a simulated electrical cable fire exposure under controlled laboratory conditions. The test addresses the unique characteristics existing when a fire occurs within the concealed space created by the raised floor system. The test provides measurements of flame spread potential within the concealed space and deflections of floor assembly. A fire exposure developed using scientific data contained in the literature for burning electrical cables is the basis for the burner input profile.

Test results must not be used to describe or appraise the fire hazard under actual fire conditions. The test is not intended to supply full information regarding performance of the assembly with floor coverings or construction components other than those tested, or for floor configurations other than those tested. This test will not supply information pertaining to fire hazard components such as toxic gases, transfer of smoke, or other products of combustion, through the floor surface assembly; or measurement of flame spread over the surface of the floor system.

A1–2.0 TEST SETUP

The test setup includes the construction of a minimum 10 foot by 10 foot (3048 mm by 3048 mm) noncombustible base floor assembly. This base floor assembly consists of sheets of 0.06 inch (1.5 mm) (No. 16 gage) reinforced sheet steel supported on concrete blocks spaced at 3 feet (914 mm) on center both directions such that the steel is approximately 24 inches (610 mm) above the test facility floor. The test facility floor shall be a concrete or masonry floor, capable of supporting the weight of the raised floor test setup and the externally applied floor load. A single layer of $^{5}/_{8}$ inch (15.9 mm) Type X gypsum wallboard is placed on top of the sheet steel to finish the noncombustible base floor. Three-quarter-inch-thick (19.1 mm) plywood can be used in place of the gypsum wallboard when recognition of use over combustible flooring is desired. Plan and elevation views of the basic noncombustible base floor test setup are shown in Figure A1-1.

Thermocouples are symmetrically placed over the base floor assembly to monitor temperatures within the concealed space and of the individual raised floor assembly components. Twenty-four 0.02 in (0.5 mm) (24 gauge) Type “K” (Chromel-Alumel) welded junction thermocouples (TCs) are positioned on the base floor assembly as shown in Figure A1-2. The welded junction of each TC is positioned such that the tip of the TC is located at or just below the floor panel surface forming the finished floor of the concealed space.

Deflection measurements of the finished floor assembly are to be made using a minimum of two linear voltage displacement transducers (LVDTs). The LVDTs shall be positioned along the centerline of the floor assembly midway of floor panel span between supports and approximately 3.5 ft (1067 mm) in from each edge. Locations of the LVDTs (positioned on top of the finished floor assembly) are shown in Figure A1-2. Alternate methods for measuring floor panel deflection shall be permitted.

The heat input simulating electrical cabling burning within the concealed space is to be provided by a line burner ignition source. The line burner consists of three nominally 40 inch (1016 mm) long sections of $^{3}/_{4}$ inch (19 mm) black iron pipe with $^{1}/_{16}$ inch (1.6 mm) diameter holes, spaced $^{1}/_{2}$ inch (12.7 mm) on center, drilled on opposite sides of each leg of the burner. The holes in each leg of the burner shall be oriented such that one hole faced up and the other hole faces down, to provide the maximum impingement on the grid support units and the finished floor panels. Each of the three line burner legs are spaced 8 inches (203 mm) apart, on center. A view of the line burner and the location in relation to the base floor assembly and the instrumentation is shown in Figures A1-1 and A1-2. The burner input profile, simulating electrical cabling burning within the concealed space is as show in Table A1-1.

The test setup shall be constructed in a nominally draft free environment with sufficient dimensions such that ample combustion air is present within the test facility to permit conduct of the test.

TABLE A1-1—BURNER INPUT PROFILE

TIME (min)	BURNER HEAT RELEASE RATE (kW)
0	40
5	65
10	100
20	0 (end of test)

A1-3.0 FLOOR TEST ASSEMBLY

The raised floor test assembly, submitted for testing, shall have a minimum 10 foot by 10 foot (3048 mm by 3048 mm) assembled area. The intersection of four or more panels shall correspond with the center of the base floor assembly and the line burner. The raised floor system shall be installed at the maximum height for which recognition is sought.

No artificial air movement is permitted to be generated in the space between the base floor assembly and the finished floor assembly (i.e., within the concealed space).

A1-4.0 TEST PERFORMANCE

Prior to testing of the raised floor assembly, a calibration test must be conducted on a noncombustible floor assembly. The noncombustible floor assembly shall consist of the noncombustible base floor described in Section A1-3.0 and a single layer of $^{5}/_{8}$-inch (15.9 mm) Type X gypsum wallboard to form the top of the concealed space (finished flooring). Firebricks, nominally 2 inches (51 mm) high are to be placed on the base floor assembly in such a manner to support the noncombustible (gypsum wallboard) concealed space top. The location of the firebrick supports shall not interfere with the burner fire spread or shield any of the TCs located within the concealed space. The burner heat input provided in Table A1-1 shall be followed. Upon completion of the calibration test, visual observations shall be taken noting the damage pattern and the approximate damage area.

For all testing, the temperatures measured within the concealed space shall be monitored at least every 10 seconds during the test. Photographic documentation (video and color still pictures) shall be performed for all tests to maintain a permanent record of the test conduct and performance. The photographic documentation shall include post-test video or photographs showing the extent of damage to the supporting floor as well as the underside of the raised floor system.

The raised floor assembly exposed to the fire test shall be loaded with a superimposed, live load. At a minimum, the floor assembly shall be loaded to 30 psf (1436 Pa) to provide a nominal load during the testing of the raised floor assembly. The floor assembly shall be monitored for its structural integrity (ability to carry the superimposed load) for the duration of the test using the LVDTs described in Section A1-2.0. Flame propagation due to burning of the raised floor materials within the concealed space shall not spread to the edges of the test assembly and the resulting damage to the floor system shall not exceed the area of the test mockup or the damage area generated during the calibration test, whichever is less.

The test duration is 20 minutes, but the test may be terminated sooner if any one of the following conditions is observed:

1. Continuous flame propagation exceeding the area of the test mockup;

2, The floor system collapses from the superimposed load; or

A5.0 CONDITIONS OF ACCEPTANCE

The performance of the raised floor system shall be rated with respect to passing or failing all of the following criteria:

1. No flame propagation due to the burning of the raised floor system exceeding the area of the floor assembly mockup shall be observed within the concealed space, for the 20 minute test duration;

2. Deflection of the loaded raised floor assembly shall not exceed one-half the pre-test height of the raised floor system;

3. Collapse of any part of the loaded floor system shall not occur at any point during the 20 minute test;

4. Obscuration of all surfaces of the finished floor assembly, even temporarily, by smoke, shall not occur during the conduct of the test as viewed overhead. A videotape of the conduct of the test, for photographic documentation purposes, shall be used to verify compliance with these performance criteria.

5. The damage within the concealed space shall not exceed 100 square feet (9.3 m^2) or the area determined from the calibration run, whichever is less.

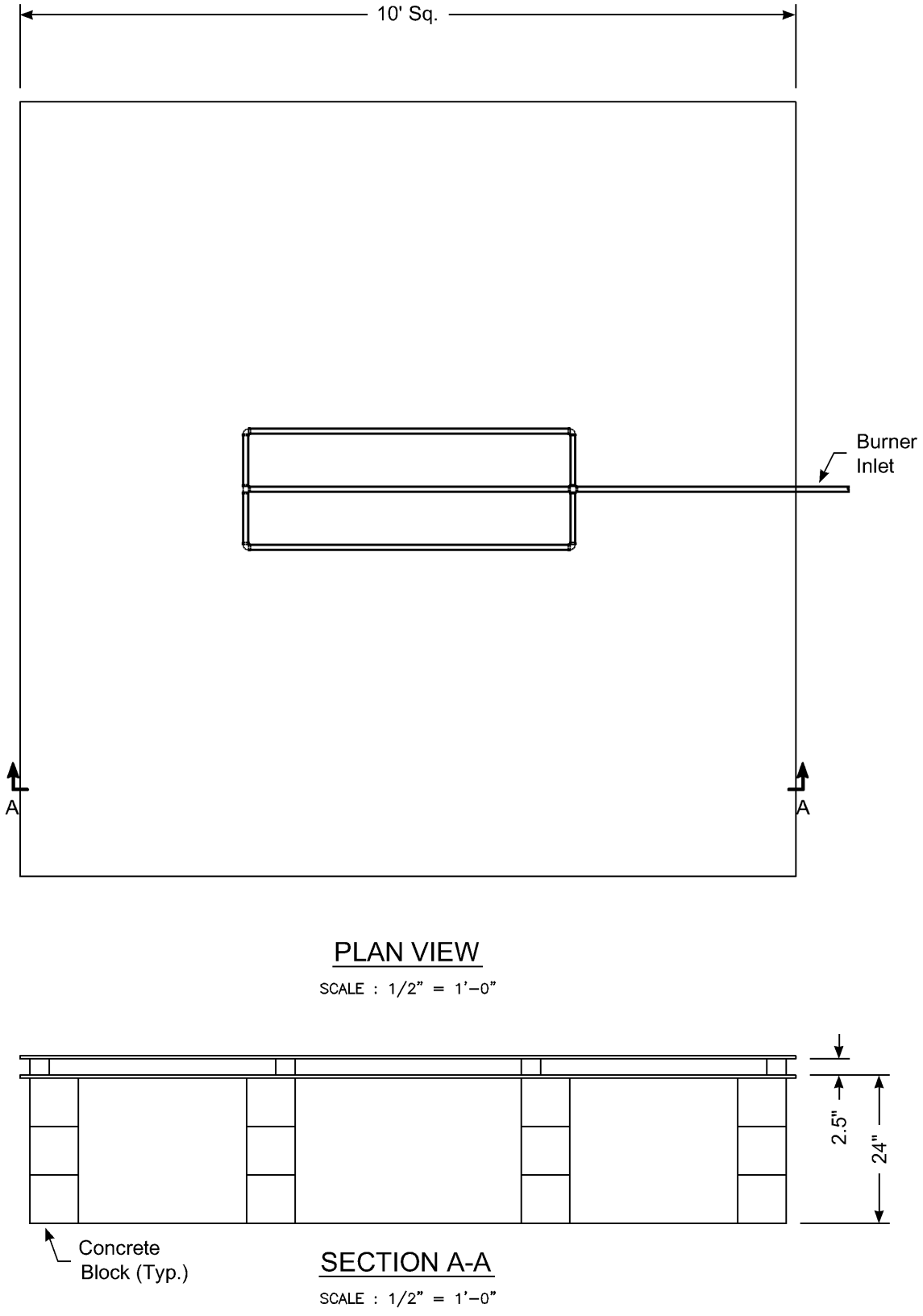
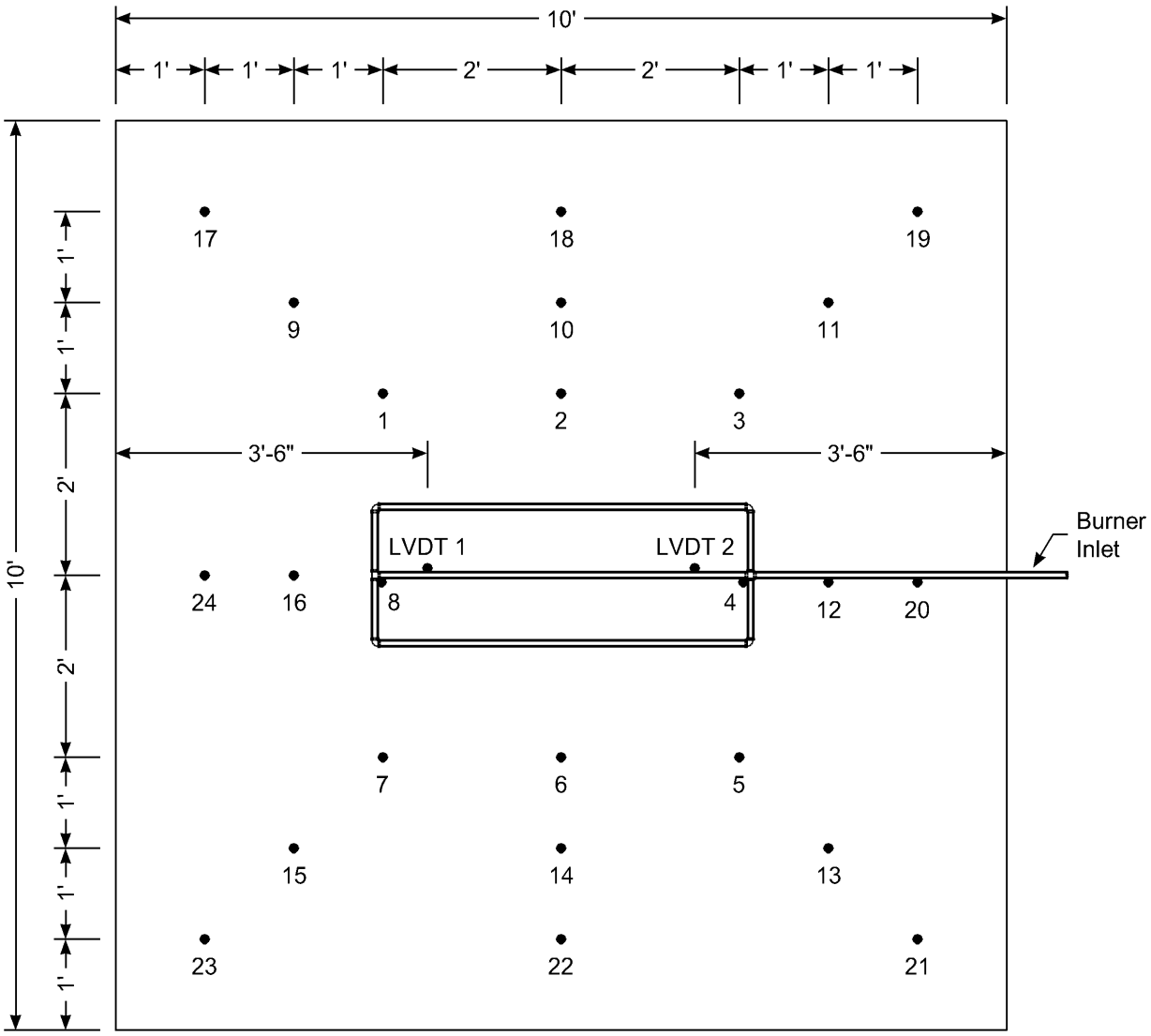


FIGURE A1–1 VIEW OF BASIC TEST SETUP



Note: LVDT's Positioned On Top Of Finished Floor Assembly

TCS positioned at or below the finished floor panels in the concealed space.

FIGURE A1–2 INSTRUMENTATION LAYOUT

ANNEX 2

Top-of-floor Fire Test for Raised Floor System Exposed to Fire Conditions

A 2-1.0 INTRODUCTION

The low-profile, raised floor system is defined in Section A2-3.0 and is comprised of raised floor panels fastened to a supporting framework installed over the base-floor surface. The system is not a structural component of the floor construction.

The test assesses the properties of a nonplenum, low-profile, raised floor system exposed to heat and flame applied to the top of the floor system under controlled laboratory conditions. The test addresses the unique characteristics of a low-profile, raised floor system. The test provides measurements of transmission of heat and of smoke generation, and an assessment of ignition properties of any of the fixed-height, low-profile, raised floor system elements (including those located in the concealed space), such as panels, supports, communication cables, and fasteners for the conditions tested. The time-temperature curve of UBC Standard 7-1 or ASTM E 119 is utilized for this test.

Test results must not be used to describe or appraise the fire hazard under actual fire conditions. The test is not intended to supply full information regarding performance of the assembly with floor coverings or construction components other than those tested, or for floor configurations other than those tested. The test will not supply information pertaining to fire hazard components such as toxic gases; transfer of smoke, or other products of combustion, through the floor surface assembly; or measurement of flame spread over the surface of the floor system.

The test does not evaluate the effect of fire exposure on conventional openings in the floor assembly (including electrical outlets or conductors for communication cables, etc.), unless specifically requested, designed, and provided with the test assembly.

A2-2.0 FIRE CHAMBER

The internal dimensions of the fire chamber are 5 feet (1524 mm) (length) by 5 feet (1524 mm) (width) by 3 feet (914 mm) (height). The walls of the chamber are to be well insulated, and are to have openings to install one gas burner and one thermocouple in each wall, and are to have a window for visual evaluation of the performance of test assembly components during the test. A chimney 14 inches (356 mm) square and 4 feet (1219 mm) in height must be provided to vent the fire chamber. A standard nonilluminated exit sign complying with Section 1003.2.8 of the UBC or Section 1003.2.10.2 of the IBC must be positioned 6 inches (152 mm) behind the chimney end, with the bottom edge of the sign 6 inches (152 mm) above the chimney end, for evaluation of smoke generation.

The test fire chamber must be installed in the center of the access floor assembly. Installation of fire-resistant supports between the base floor and subfloor, near the four corners of the fire chamber, is recommended to provide chamber support in the event of fire damage to the access-floor supporting structure.

Burners must supply sufficient heat to meet the requirements of the standard time-temperature curve of UBC Standard 7-1 or ASTM E 119, and must be located 26 inches (660 mm) above the raised floor test assembly, facing the raised floor surface. The locations of the thermocouples, for measurement of the temperature inside the chamber (for generating the time-temperature curve), are as follows:

1. 6 inches (152 mm) below the furnace ceiling
2. 18 inches (457 mm) from the furnace wall, centered over burners

The test chamber is illustrated in Figure A2-1.

A2-3.0 FLOOR TEST ASSEMBLY

The raised floor test assembly, submitted for testing, shall have a minimum-10-foot-by-10 foot (3048 mm by 3048 mm) assembled area. The intersection of four or more panels shall be located in the center of the fire chamber. The base floor for the assembly shall be a concrete or masonry floor, protected by a layer of gypsum wallboard. No artificial air movement is permitted to be generated in the space between the base floor and subfloor panels. Communication cables shall be included in the assembly by running the cables through the supports under the subfloor, so that cables run below the panels in the fire chamber in such a manner that they are not less than 12 inches (304.8 mm) from the furnace wall.

At least four thermocouples must be located under the floor panels in the chamber, to measure the temperature of the unexposed panel side during the test. As an alternative, one thermocouple is placed under each floor panel in the chamber. The thermocouples are then attached as near to the center of the panel as possible, but are not covered by or in contact with the floor supports. The thermocouple must be attached to the panel by means of fire-resistant cement.

Thermocouples shall be located under the supports or in the vicinity of the supports. Between supports, the thermocouples shall be equidistant.

A2-4.0 TEST PERFORMANCE

Prior to testing of the raised floor assembly, the fire chamber must be calibrated using noncombustible low-heat-transfer material (for example, gypsum wallboard panels) to confirm conformance to the time-temperature curve.

The smoke obstruction of the exit sign must be recorded using a video camera located a maximum of 15 feet (4572 mm) from the chimney end.

The temperature of the furnace and unexposed floor surface shall be monitored at least every 30 seconds during the test.

The floor assembly exposed to the test shall be monitored for its integrity and capability to protect the concealed space, and inspection shall include the supports, the cables and the unexposed floor panels. Fire damage shall not spread beyond the area of the floor panels contained within the perimeter walls of the furnace and the subfloor space directly below.

The test duration is one hour, but the test may be terminated sooner if any one of the following conditions is observed:

1. The fire damage extends beyond the furnace perimeter.
2. Flaming occurs beyond the furnace perimeter.
3. The exit sign becomes obscured by smoke.

A2-5.0 CONDITIONS OF ACCEPTANCE

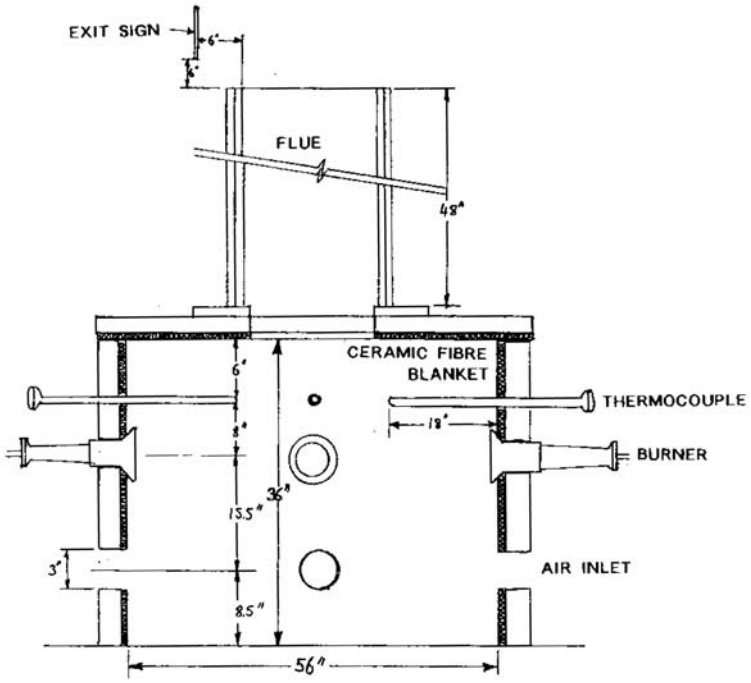
The performance of the access floor assembly will be rated with respect to passing or failing all of the following criteria:

1. No flame propagation or fire damage shall be observed, on the floor surface, beyond the perimeter of the fire test chamber, or in the concealed space beyond the perimeter of the furnace walls, within the one-hour test duration.

2. The time at which the average temperature increase of the set of thermocouples installed on the unexposed surface of the floor panels is more than 250˚F (139˚C) above the initial temperature is 30 minutes, or more, after the start of the test.

3. The time at which the temperature increase of any one of the thermocouples installed on the unexposed surface of the floor panels is more than 325˚F (181˚C) above the initial temperature is 30 minutes, or more, after the start of the test.

4. Obscuring of the exit sign, even temporarily, by smoke, as evidenced by the videotape record, shall not occur within the first half-hour of the test. (The lettering on the exit sign must be identifiable.)



For **SI:** 1 inch = 25.4 mm.

FIGURE A2-1—FURNACE DESCRIPTION