

HORIZONTAL PROJECTION UNDERSIDE SFM STANDARD 12-7A-3

12-7A-3.1 Application. The minimum design, construction and performance standards set forth herein for the exposed underside of horizontal projections such as the horizontal soffits of roof eaves, floor projections, and exposed underfloor areas are those deemed necessary to establish conformance to the provisions of these regulations. Materials and assemblies that meet the performance criteria of this standard are acceptable for use as defined in the California Building Standards Code.

12-7A-3.2 Scope. This standard evaluates the fire-resistive performance of horizontal projection assemblies including the horizontal soffits of roof eaves, floor projections, and exposed underfloor areas when subjected to direct flame exposure to the underside of a horizontal projection.

12-7A-3.3 Referenced documents.

1. ASTM D 4442, Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials.
2. ASTM D 4444, Test Methods for Use and Calibration of Hand-Held Moisture Meters
3. *California Building Code*, Chapter 7A.

12-7A-3.4 Definitions.

1. **Eaves.** A projecting edge of a roof that extends beyond the supporting wall as in CBC 702A "Roof Eave" or similar horizontal projection assembly.
2. **Soffit.** The enclosed underside of any exterior overhanging section of a roof eave or similar horizontal projection assembly (see CBC 702A "Roof Eave Soffit").

12-7A-3.5 Equipment.

1. **Burner.** A 12 by 12-inch (300 by 300 mm) diffusion burner shall be used. Natural gas, methane or propane shall be supplied to the burner through a metered control system. The gas supply to the burner shall produce a net heat output of 300 ± 15 kW throughout the flame exposure. Burner output can be determined from HRR or calculated from the gas flow rate, temperature, and pressure.
2. **Infrared temperature analyzer** (optional). Intended for monitoring the temperature change of the inside of the eaves.
3. **Moisture content.** Prior to testing, all materials (lumber and soffit material) shall be conditioned to a constant weight or for a minimum of 30 days at 73 ± 4 °F (23 ± 2 °C) and 50 ± 5 % relative humidity, whichever occurs first. Constant weight shall be defined as occurring when the change in test material weight is less than or equal to 2 percent in a 24-hour period. Lumber moisture content shall be between 8 and 12 percent (oven-dry basis) and sheathing shall not exceed 8 percent (oven-dry basis).

12-7A-3.6 Materials.

1. **Framing.** The materials used shall be representative of the grades that would be typical of eave construction

and installed in the eave's subassembly as per accepted construction practices.

2. **Soffit.** Material selected for the test.

12-7A-3.7 Test system preparation (Figure 1).

1. **Eaves fabrication.** The 4-foot-wide by 2-foot (1.2 m by 0.6 m) test specimen shall be constructed to fit into a 4-foot-wide (1.2 m) space at the top of the test assembly described in SFM 12-7A-1. Normal eave framing, joints in soffit material, and other typical features present in the constructed assembly shall be present in the test specimen.
2. **Test Fixture.** The test fixture shall be as described in SFM 12-7A-1, with the exception that the top soffit projection of the wall assembly fixture is modified to facilitate installation and removal of eave assemblies. Gypsum board (or equivalent) is used to create a noncombustible wall surface in the 4 x 8 ft. opening in the wall test fixture.
3. **Eaves assembly.** Fit the eave assembly into the test module so that the horizontal surface of the assembly is 84 inches (2.1 m) from the top of the burner.
4. **Moisture content.** Measure the moisture content of the wooden members of the assembly using a moisture meter (ASTM D 4444), and, for sheathing products, by methods outlined in ASTM D 4442.
5. **Sealing.** Seal the edges and ends with ceramic wool or comparable material to prevent flame penetration in these locations of the eave assembly.

12-7A-3.8 Conduct of Tests.

1. **Airflow.** The wall test shall be conducted under conditions of ambient airflow.
2. **Number of tests.** Conduct the tests on three replicate eaves assemblies.
3. **Burner output verification.** Without the eaves assembly in place, adjust the burner for 300 ± 15 kW output. Extinguish the burner.
4. **Burner positioning.** Center the burner with respect to the width of the eaves wall assembly and 0.75 inch (20 mm) from the wall. The distance from the floor to the top of the burner shall be 12 inches (300 mm).
5. **Procedure.**
 - 5.1 **Ignition.** Ignite the burner, controlling for a constant 300 ± 15 kW output.
 - 5.2 **Flame exposure.** Continue the exposure until flame penetration of the eaves occurs or for a 10-minute period.
 - 5.3 **Continued combustion.** If penetration does not occur, continue observation for an additional 30 minutes or until all combustion has ceased.

Note: An infrared thermometer has been found to be useful to detect the increase of temperature on the back side of the eaves and

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as an aid to identify the areas of potential combustion.

6. **Observations.** Note the time, location and nature of flame penetration.

12-7A-3.9 Report. The report shall include a description of the eaves material, details of the construction of the eaves, moisture content of the framing and wood-based soffit elements as applicable, and point of flame penetration. Provide details on the time and reasons for early termination of the test.

12-7A-3.10 Conditions of Acceptance. Should one of the three replicates fail to meet the Conditions of Acceptance, three additional tests may be run. All of the additional tests must meet the Conditions of Acceptance.

1. Absence of flame penetration of the eaves or horizontal projection assembly at any time.
2. Absence of structural failure of the eaves or horizontal projection subassembly at any time.
3. Absence of sustained combustion of any kind at the conclusion of the 40-minute test.

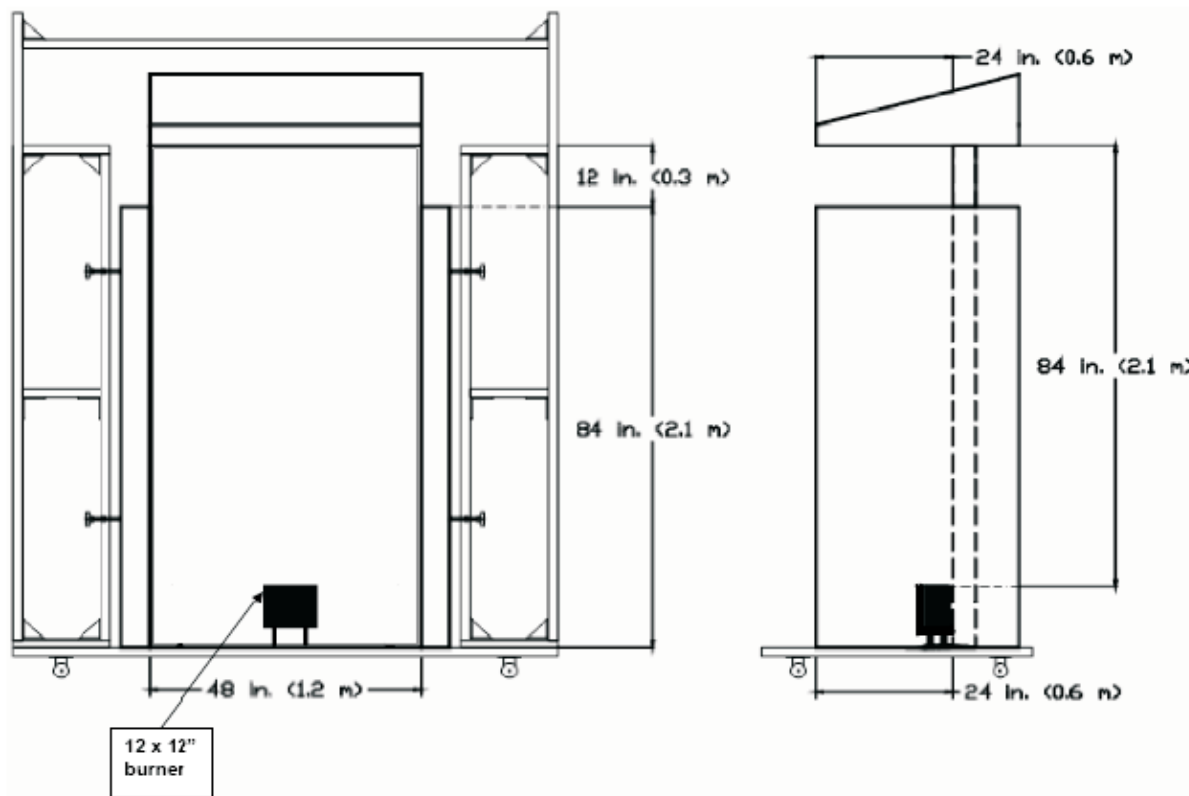


FIGURE 1. EAVES TEST ASSEMBLY