

Chapter 12-7A
**MATERIALS AND CONSTRUCTION METHODS FOR
EXTERIOR WILDFIRE EXPOSURE**
EXTERIOR WALL SIDING AND SHEATHING
SFM STANDARD 12-7A-1

12-7A-1.1 Application. The minimum design, construction and performance standards set forth herein for exterior wall siding and sheathing 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 in Very High Fire Hazard Zones as defined in California Building Code, Chapter 7A.

12-7A-1.2 Scope. This standard determines the performance of exterior walls of structures when exposed to direct flames.

12-7A-1.3 Referenced Documents.

1. ASTM D4444. Standard Test Methods for Use and Calibration of Hand-held Moisture Meters
2. ASTM D2898. Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing
3. California Building Code, Chapters 7A and 35

12-7A-1.4 Definitions.

1. **Cladding.** Any material that covers an interior or exterior wall.
2. **Sheathing.** The outside covering used over the wall framework and is nailed directly to the wall framing members.

12-7A-1.5 Equipment.

1. **Burner.** A 4 × 39 inch (100 × 1000 mm) propane diffusion burner shall be used.
2. **Infrared temperature analyzer (optional).** Intended for monitoring the temperature change of the inside of the sheathing material.
3. **Moisture meter.** For measurement of moisture content of framing.

12-7A-1.6 Materials.

1. **Cladding.** Material selected for the test.
2. **Sheathing (optional).** 4- × 8-ft (1.2- × 2.4-m) sheet.
3. **Framing.** 2 × 4 studs.

12-7A-1.7 Test System Preparation. See Figure No. 12-7A-1-1.

1. **Wall module.** The module shall be designed to permit rapid installation and removal of wall assemblies and have two adjustable noncombustible sidewalls, and a noncombustible simulated soffit. The module shall permit insertion of a prefabricated 4 × 8 ft (1.2 × 2.4 m) wall section.
2. **Framing.** Frame the wall assembly with 2 × 4 studs, typically 16 inches (410 mm) on center.
3. **Moisture content.** Measure the moisture content of the wooden members of the assembly using a moisture meter (ASTM D4444).
4. **Sheathing.** Add sheathing material (optional). If sheathing is used, tests must be run on nominal 0.5-inch (12 mm) oriented strandboard of Exposure 1 rating. Any other sheathing may be run, but must be reported. The sheathing must have one seam on a selected stud with a 0.125-inch (3 mm) gap.

5. **Cladding.** Attach the chosen cladding according to the cladding manufacturer's directions. All potential cladding joints that may be present in a typical wall must be incorporated into the assembly.
6. **Other materials.** Other components of the wall assembly, such as building felt and sheathing, are chosen to meet the manufacturer's specifications and/or local building codes. Cavity insulation is not to be used.
7. **Sealing.** Seal the top and side edges of the installed wall with ceramic wool or comparable material to prevent flame penetration at the edges.
8. **Finish.** The wall should be finished in a manner appropriate for exterior exposure as specified by the manufacturer.

12-7A-1.8 Pretest Weathering (optional).

1. **Number of test assemblies.** Prepare six assemblies of which three shall be randomly selected for the weathering exposure. The remaining three assemblies shall be tested as unweathered controls.
2. **Preparation.** The back of the wall assembly must be protected from water penetration by stapling or taping a 4 × 8 ft (1.2 × 2.4 m) sheet of polyethylene film to the outside of the framing members (the side opposite the cladding) to protect the interior of the wall cavity from being wetted by overspray.
3. **Weathering.** Subject the assembly to the 12-week wetting-drying weathering exposure defined in ASTM D2898, Method A, with the following modifications:
 - 3.1 The assembly shall be mounted vertically.
 - 3.2 The heating cycle shall consist of air heated at 125 ± 5 °F (50 ± 2 °F (50 ± 2 °C) impinging on the wall at 10 mph (17 km/h or 4.5 m/s).
 - 3.3 An ultraviolet exposure shall be used during the weathering exposure, with the lamps activated during the 72-hour drying cycles. Installation and exposure details regarding the sunlamps shall be as described in ASTM D2898, but shall be modified for a sample having a vertical orientation.
 - 3.4 The polyethylene film shall be removed after weathering is completed.
4. **Conditioning.** Prior to testing, the weathered wall assemblies shall be stored for at least 2 weeks indoors with good air circulation at temperatures between 60 and 90 °F (16 to 32 °C) to allow excess moisture to evaporate.

12-7A-1.9 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 wall assemblies (six for weathered performance).
3. **Burner output verification.** Without the wall assembly in place, adjust the burner for 150 ± 8 kW output. Extinguish the burner.
4. **Burner configuration.** Center the burner relative to the width of the cladding-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).

4.1 Procedure.

- 4.1.1 Ignite the burner, controlling for constant 150 ± 8 kW output.
- 4.1.2 Continue the exposure until flame penetration of the cladding-wall assembly occurs, or for a 10-minute period.
- 4.1.3 If penetration does not occur, continue the test for an additional 60 minutes or until all combustion has ceased. An infrared thermometer has been found to be useful to detect the increase of temperature on the back side of the sheathing and an aid to identify the areas of potential combustion.

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

12-7A-1.10 Report. The report shall include a description of the wall cladding, sheathing material and details of the construction of the subassembly, details of the cladding installation, moisture content of the framing, whether the weathering test was conducted and where flame penetration of the wall occurred. Provide details on the time and reasons for early termination of the test.

12-7A-1.11 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 through the wall assembly at any time.
- 2. Absence of evidence of glowing combustion on the interior surface of the assembly at the end of the 70-minute test.

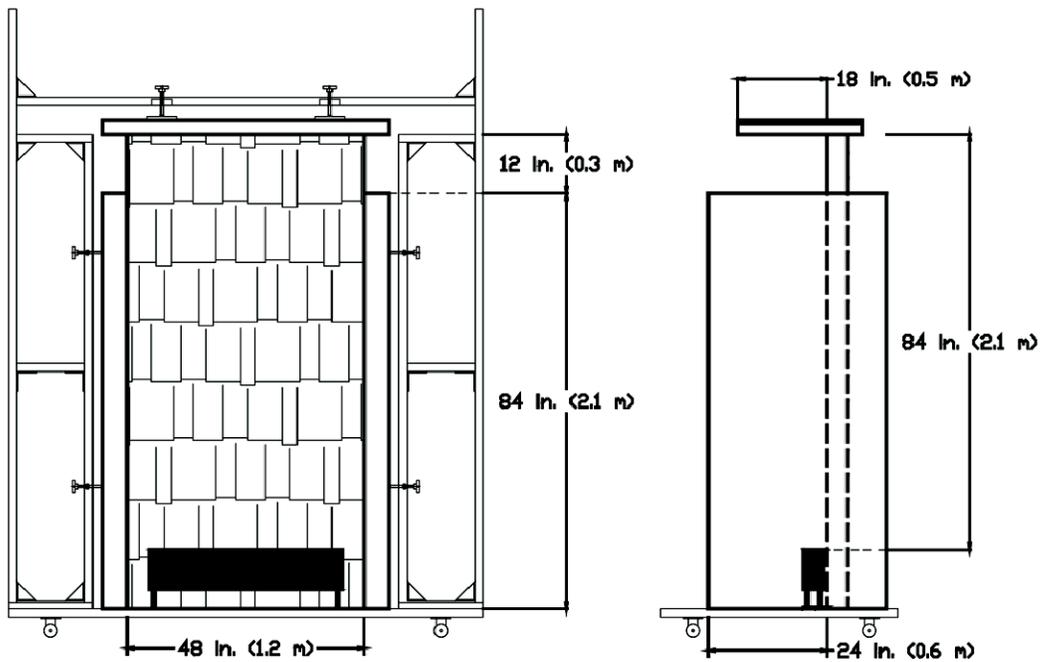


FIGURE 12-7A-1-1. EXTERIOR WALL TEST ASSEMBLY