

**EXTERIOR WINDOWS**  
**SFM STANDARD 12-7A-2**

**12-7A-2.1 Application.** The minimum design, construction and performance standards set forth herein for exterior windows are those deemed necessary to establish conformance to the provisions of these regulations.

**12-7A-2.2 Scope.** This standard evaluates the performance of exterior windows used in structures when exposed to direct flames.

**12-7A-2.3 Tested and Listed Materials.** Materials and assemblies which have been tested and listed by an approved testing agency for the intended purpose need not be individually retested. Such individually tested and listed materials and assemblies shall be subjected to the performance standard tests to determine their suitability for use in the exterior window assembly.

**12-7A-2.4 Alternate Constructions.** This standard does not expressly require the use of specific materials or forms of construction. Combinations of materials and assemblies may be investigated and tested in accordance with these regulations, and if found to be substantially equivalent in performance may be given recognition for approval.

**12-7A-2.5 Referenced Documents.**

1. AAMA (for definitions) Training Manual, Residential & Light Commercial Window and Door Installation Training and Registration Program.
2. CAWM 400-95 Standard practice for installation of windows with integral mounting flange in wood frame construction.

**12-7A-2.6 Definitions.**

1. **Glazing.** The glass in a window. It may include layers of plastic as well as glass.
2. **Sash.** The fixed or movable parts of the window in which the panes of glass are set.
3. **Frame (jambs).** This usually consists of two vertical members (side jambs) and two horizontal members (head and sill) that hold the sash. Frames and sash are typically made of steel, aluminum, vinyl, fiberglass, wood or a combination of these materials.

**12-7A-2.7 Test Apparatus.**

1. **Wall assembly test module.** The module is designed to permit rapid installation and removal of window/wall assemblies, and is designed to prevent edge penetration of fire at the margins. It includes two noncombustible side walls attached to a wall frame assembly, and a simulated soffit that is also noncombustible. The assembly permits a prefabricated 4 x 8 ft (1.2 x 2.4 m) wall section containing the test window to be inserted from the rear and sealed in such a way that the edges are protected from fire (see Figure 1).
2. **Burner.** A 4 x 39 inch (100 x 1000 mm) propane diffusion burner shall be used.
3. **Burner location.** The burner shall be positioned so that it is centered relative to the width of the wall assembly and against the wall. The distance from the floor to the top of the burner shall be 12 inches (300 mm).

**12-7A-2.8 Test Assembly.**

1. **Window.** The window may be any type or size that fits within the wall. The burner's flame should cover the full width of the window and at least half the window height. Note: Large

er windows may be tested by expanding the size of the rear wall of the Wall Assembly Test Module.

2. **Wall assembly.** A noncombustible wall shall be used with a manufacturer or code-specified opening for the particular window.
3. **Materials.** In the absence of the window manufacturer's specifications, the wall assembly shall include the following minimum components:
  - 3.1 2 x 4 inch studs spaced 16 inches (410 mm) on center, framed out to incorporate a rough opening sized to receive the test window such that the window is centered relative to the width of the wall;
  - 3.2 gypsum board for mounting around the window once it is installed;
  - 3.3 pieces of gypsum cut into narrow strips for use as trim around the window.
  - 3.4 caulk to be used as per the window manufacturer's instructions.
4. Install window in frame rough opening following manufacturer guidelines. Apply manufacturer recommended caulk to nailing flange prior to installation. Use narrow strips of gypsum board as trim around window, covering the nail flange of the window. Any type of framing material may be tested. Apply finish to window frame if recommended by window manufacturer. Note: A finish coat is usually required only for wood-framed windows.
  - 4.1 Fit the window into the rear wall of the Wall Assembly Test Module, sealing all edges, including the soffit-to-wall joint. Ceramic wool or comparable materials shall be used for sealing.

**12-7A-2.9 Conduct of Tests.**

1. **Burner output verification.** Without the window in place, set the burner for 150 kW output. Conduct a verification run of 3 minutes to assure the heat release rate, and then turn off the burner.
2. **Test.** Place the burner against the wall assembly at the center. Ignite the burner at the 150 kW output for 3 minutes and control during the test for constant and uniform output. Optional radiometers can be placed behind the Wall Assembly Test Module to measure heat flux through the window glass.
3. **Duration and observations.** The test shall be continued until flame-through occurs at the window. Flame-through can occur at the glass (glazing) and/or in the frame. At this point, the burner shall be extinguished and the assembly monitored for sustained combustion. Note the time elapsed and location of penetration if it occurs.
4. **Report.** Report a description of the window unit, including the types of frames, cladding and panes being tested and details of the installation. Record when and how the glass breaks or flame-through occurs in the framing materials or sash, and/or if the framing material deforms or otherwise suffers a loss of integrity such that the glass cannot be held in place, and a record of the time at which any of these events occur.

**12-7A-2.10 Conditions of Acceptance.**

1. **Duration of direct flame exposure.** To pass this test standard, the window and window assembly shall withstand 8 minutes of direct flame exposure with the absence of flame

penetration through the window frame or pane, or structural failure of the window frame or pane.

2. Flame penetration or structural failure of the flame or pane anytime during the test constitutes failure of this test standard.

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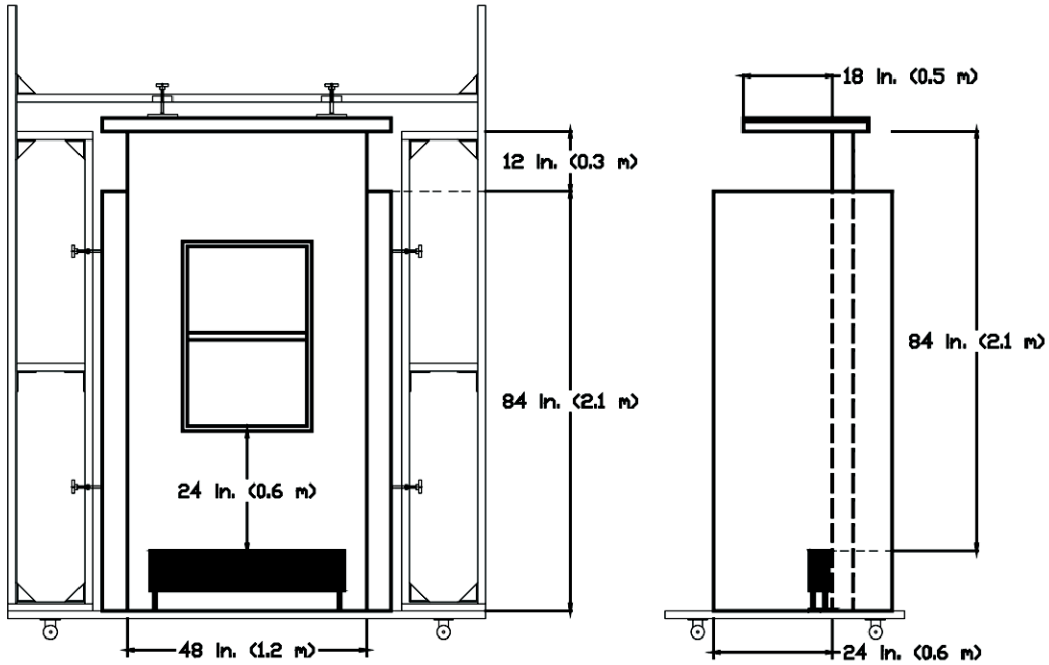


FIGURE 12-7A-2-1. SCHEMATIC OF THE WALL ASSEMBLY TEST MODULE USED FOR EVALUATING THE FIRE PERFORMANCE OF A WINDOW