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257

FIRE TESTS OF WINDOW ASSEMBLIES 1975

NATIONAL FIRE PROTECTION ASSOCIATION

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LISTED: Equipment or materials included in a list published by a nationally recognized testing laboratory, inspection agency, or other organization concerned with product evaluation, that maintains periodic inspection of production of listed equipment or materials and whose listing states either that the equipment or material meets nationally recognized standards or has been tested and found suitable for use in a specified manner.

NOTE: The means for identifying listed equipment may vary for each testing laboratory, inspection agency or other organization concerned with product evaluation, some of which do not recognize equipment as listed unless it is also labeled. The authority having jurisdiction should utilize the system employed by the listing organization to identify a listed product.

SHALL: is intended to indicate requirements.

SHOULD: is intended to indicate recommendations or that which is advised but not required.

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Standard for

Fire Tests of Window Assemblies

NFPA 257 — 1975

This edition of NFPA 257 was officially adopted on May 14, 1975 at the Annual Meeting of the Association held in Chicago, IL.

This *Standard* was tentatively adopted by the Association in 1969. It was published and distributed for comment at that time, and since none was received by the Committee, no changes were made in the 1970 edition. The 1975 edition was edited in conformance with the *NFPA Style Manual*, including the use of the new text numbering system, and substantively reconfirmed in May 1975.

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This list represents the membership at the time the Committee was balloted on the text of this edition. Since that time, changes in the membership may have occurred.

Standard for

Fire Tests of Window Assemblies

NFPA 257 — 1975

Chapter 1 General

1-1 Scope.

1-1.1 (a) These methods of fire tests are applicable to window assemblies, including glass block and other light transmitting assemblies, for use in wall openings to retard the passage of fire.

NOTE: It should be noted that assemblies classified in accordance with the provisions of this Standard afford only limited protection from the transmission of heat or against radiation hazard.

(b) Tests made in conformity with these test methods will register performance during the test exposure and develop data to enable regulatory bodies to determine the suitability of window assemblies for use in wall openings where fire protection is required. Such tests shall not be construed as determining suitability of window assemblies for continued use after fire exposure.

Chapter 2 Control of Fire Tests

2-1 Time-Temperature Curve. (*See Figure 2-1.1.*)

2-1.1 The fire exposure of window assemblies shall be controlled to conform to the standard time-temperature curve shown in Figure 2-1.1. The points on the curve that determine its character are:

1000 F (538 C)	at 5 minutes
1300 F (704 C)	at 10 minutes
1399 F (760 C)	at 15 minutes
1462 F (795 C)	at 20 minutes
1510 F (821 C)	at 25 minutes
1550 F (843 C)	at 30 minutes
1584 F (868 C)	at 35 minutes
1613 F (878 C)	at 40 minutes
1638 F (892 C)	at 45 minutes

2-2 Furnace Temperatures.

2-2.1 (a) The temperatures of the test exposure shall be the average temperature obtained from the readings of not less than

nine thermocouples symmetrically disposed and distributed to show the temperature near all parts of the test assembly. The thermocouples shall be protected by sealed porcelain tubes having ¾-inch (19mm) outside diameter and ⅛-inch (3mm) wall thickness or, as an alternate in the case of base-metal thermocouples, protected by sealed ½-inch (13mm) wrought-steel or wrought-iron pipe of standard weight. The exposed length of the thermocouple protection tube in the furnace chamber shall be not less than 12 inches (304.8mm). The junction of the thermocouples shall be 6 inches (152.4mm) from the exposed face of the test assembly or from the masonry in which the assembly is installed, during the entire test exposure.

(**b**) The temperatures shall be read at intervals not exceeding 5 minutes.

(**c**) The furnace shall be controlled so that the maximum temperature at individual points shall not exceed 1650 F (900 C) and the area under the time-temperature curve, obtained by averaging the results from the temperature readings, is within 10 percent of the corresponding area under the standard time-temperature curve shown in Figure 2-1.1.

(**d**) In case the temperature at any point does exceed 1650 F (900 C) the performance of the glass in that area shall be disregarded.

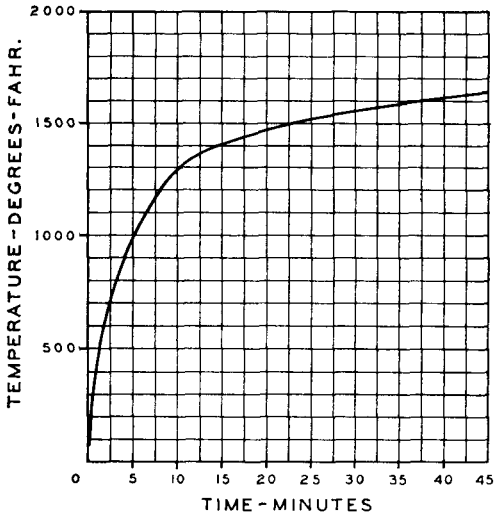

Figure 2-1.1 — Time-Temperature Curve

Chapter 3 Test Assemblies

3-1 Construction and Size.

3-1.1 (a) The design, construction, material, workmanship, and hardware of the test window assembly shall be representative of that for which approval is desired. A record of materials and construction details adequate for identification shall be made.

(b) The area of the test assembly shall be not less than 100 square feet (9.29m²), with neither dimension less than 9 feet (2.75m). If the conditions of use limit the construction to smaller dimensions, a proportionate reduction may be made in the dimensions of the test assembly for tests qualifying them for such restricted use.

3-2 Mounting.

3-2.1 The test assembly shall be installed in masonry or reinforced concrete frames in the manner in which it is to be used. It shall be mounted so that the latches and fasteners other than hinges shall be on the unexposed side, and the mounting shall not prevent the free and easy operation of all openable components such as ventilators and sash.

Chapter 4 Conduct of Tests

4-1 Time of Testing.

4-1.1 Masonry settings shall be allowed to season at least 7 days, and reinforced concrete settings at least 28 days, before fire tests are made.

4-2 Fire Endurance Test.

4-2.1 (a) The pressure in the furnace chamber shall be maintained as nearly equal to the atmospheric pressure as possible.

(b) The test shall be continued for 45 minutes unless the conditions of acceptance set forth in Chapter 5 are exceeded in a shorter period.

4-3 Hose Stream Test.

4-3.1(a) Immediately following the fire endurance test and within 1½ minutes, the fire exposed side of the test assembly shall be subjected to the impact, erosion, and cooling effects of the hose stream.

(**b**) The hose stream shall be delivered through a 2½-inch (62mm) hose discharging through a National Standard playpipe of corresponding size equipped with a 1⅛-inch (28mm) discharge tip of the standard-taper smooth-bore pattern without shoulder at the orifice.

(**c**) The tip of the nozzle shall be located 20 feet (6.1m) from and on a line normal to the center of the test assembly. If impossible to be so located, the nozzle may be on a line deviating not more than 30 degrees from the line normal to the center of the test door. When so located, the distance from the plane of the surface to the test assembly shall be less than 20 feet (6.1m) by an amount equal to 1 foot (0.31m) for each 10 degrees of deviation from the normal.

(**d**) The hose stream shall be directed around the periphery of the test assembly, starting upward from a lower corner. When the circuit is about 1 foot (0.31m) from the starting point, the hose stream shall be applied in paths about 1 foot (0.31m) apart up and down the assembly across the entire width and then back and forth horizontally across the entire height.

(**e**) The water pressure at the base of the nozzle shall be 30 pounds per square inch, and the hose stream shall be applied 6/10 second for each square foot of area of the test assembly.

Chapter 5 Conditions of Acceptance

5-1 Window Assemblies. (*See Figure 5-1.*)

5-1.1 (**a**) A window assembly shall be considered as meeting the requirements for acceptable performance when it remains in the opening during the fire endurance test and hose stream test within the following limitations:

(**b**) The window assembly shall not be loosened from its fastenings.

(**c**) Movement at the perimeter of openable components, from the intial closed position, shall not exceed the thickness of the frame member at any point.

(**d**) At least 70 percent of the edges of the individual glass lights shall remain in position throughout the hose stream test. The dislodging of small fragments from the central areas of individual lights shall be disregarded.

5-2 Glass Block Assemblies. *(See Figure 5-2.)*

5-2.1 (**a**) A glass block assembly shall be considered as meeting the requirements for acceptable performance when it remains in the opening during the fire endurance and hose stream tests within the following limitations:

(**b**) The glass block assembly shall not be loosened from the frame.

(**c**) At least 70 percent of the glass blocks shall not develop through openings.

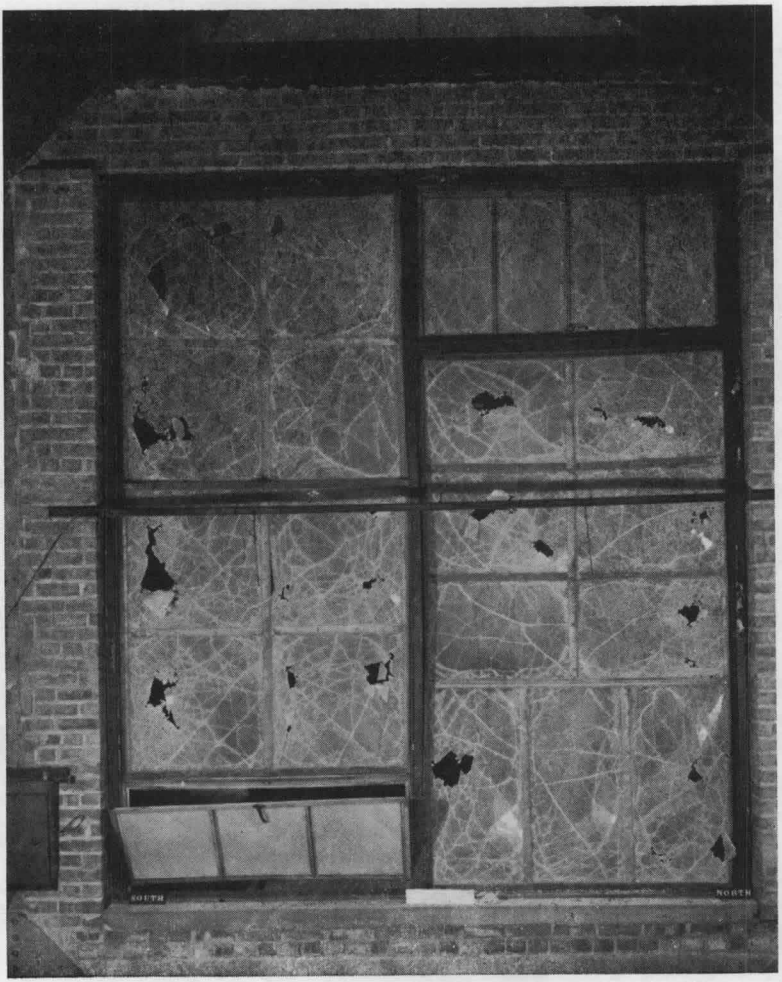

Figure 5-1 — Unexposed side of window assembly after fire exposure and hose stream application.

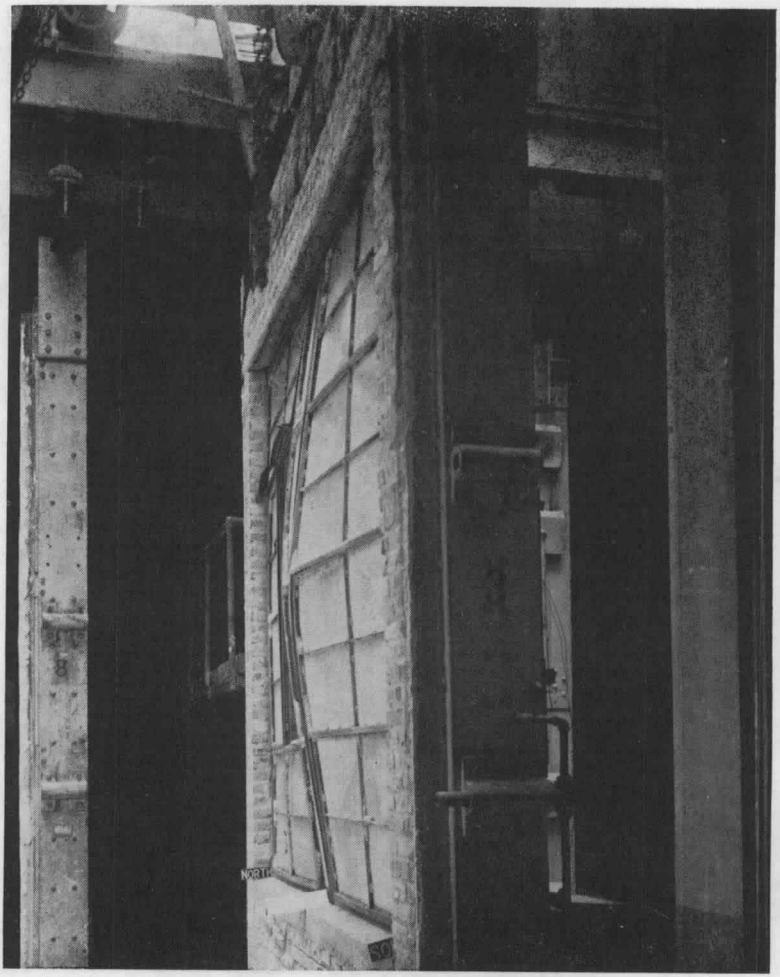

Figure 5-2 — Exposed side of window assembly after fire exposure and hose stream application.