NFPA No.

257

FIRE TESTS
WINDOW ASSEMBLIES 1970

Fifty Cents

NATIONAL FIRE PROTECTION ASSOCIATION
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Official NFPA Definitions

Adopted Jan. 23, 1964: Revised Dec. 9, 1969. Where variances to these definitions are found, efforts to eliminate such conflicts are in process.

SHALL is intended to indicate requirements.

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

APPROVED means acceptable to the authority having jurisdiction. The National Fire Protection Association does not approve, inspect or certify any installations, procedures, equipment or materials nor does it approve or evaluate testing laboratories. In determining the acceptability of installations or procedures, equipment or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure or use. The authority having jurisdiction may also refer to the listings or labeling practices of nationally recognized testing laboratories,* i.e., laboratories qualified and equipped to conduct the necessary tests, in a position to determine compliance with appropriate standards for the current production of listed items, and the satisfactory performance of such equipment or materials in actual usage.

*Among the laboratories nationally recognized by the authorities having jurisdiction in the United States and Canada are the Underwriters' Laboratories, Inc., the Factory Mutual Research Corp., the American Gas Association Laboratories, the Underwriters' Laboratories of Canada, the Canadian Standards Association Testing Laboratories, and the Canadian Gas Association Approvals Division.

LISTED: Equipment or materials included in a list published by a nationally recognized testing laboratory 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.

LABELED: Equipment or materials to which has been attached a label, symbol or other identifying mark of a nationally recognized testing laboratory that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling is indicated compliance with nationally recognized standards or tests to determine suitable usage in a specified manner.

AUTHORITY HAVING JURISDICTION: The organization, office or individual responsible for "approving" equipment, an installation, or a procedure.

Statement on NFPA Procedures

This material has been developed in the interest of safety to life and property under the published procedures of the National Fire Protection Association. These procedures are designed to assure the appointment of technically competent Committees having balanced representation from those vitally interested and active in the areas with which the Committees are concerned. These procedures provide that all Committee recommendations shall be published prior to action on them by the Association itself and that following this publication these recommendations shall be presented for adoption to the Annual Meeting of the Association where anyone in attendance, member or not, may present his views. While these procedures assure the highest degree of care neither the National Fire Protection Association, its members, nor those participating in its activities accepts any liability resulting from compliance or noncompliance with the provisions given herein, for any restrictions imposed on materials or processes, or for the completeness of the text.

Standard for

Fire Tests of Window Assemblies

NFPA No. 257 — 1970

This edition of NFPA No. 257 was officially adopted on May 21, 1970 at the Annual Meeting of the Association held in Toronto, Ont.

This text was tentatively adopted by the Association in 1969. It was published and distributed for comment and since none was received by the Committee, no changes have been made in the current text.

Committee on Fire Tests

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Lewis W. Vaughan, Canadian Sheet Steel Building Institute.
G. M. Watson, American Insurance Assn.
Calvin H. Yuill, Southwest Research Institute.

Scope: To develop standards for fire testing procedures when such standards are not available; review existing fire test standards and recommend appropriate action to NFPA; recommend the application of and advise on the interpretation of acceptable test standards for fire problems of concern to NFPA Technical Committees and members; act in a liaison capacity between NFPA and the committees of other organizations writing fire test standards.

Standard for

Fire Tests of Window Assemblies

NFPA No. 257 — 1970

Scope.

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.

CONTROL OF FIRE TESTS

Time-Temperature Curve.

2. The fire exposure of window assemblies shall be controlled to conform to the standard time-temperature curve shown in Figure 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

Furnace Temperatures.

3 (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 outside diameter and ⅛-inch wall thickness or, as an alternate in the case of base-metal thermocouples, protected by sealed ½-inch 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. The junction of the thermocouples shall be 6 inches 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 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.

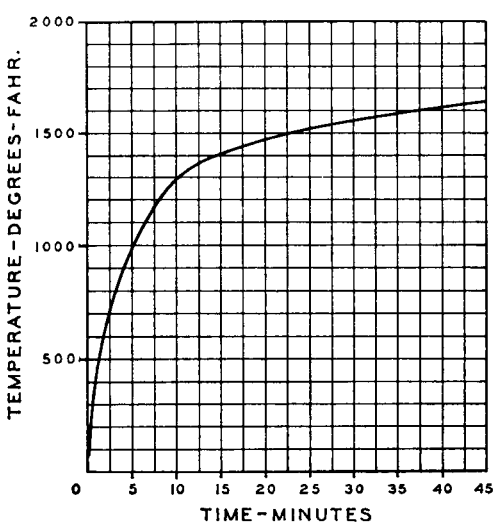


Figure 1 — Time-Temperature Curve

TEST ASSEMBLIES

Construction and Size.

4 (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, with neither dimension less than 9 feet. 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.

Mounting.

5. 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.

CONDUCT OF TESTS

Time of Testing.

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

Fire Endurance Test.

7(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 paragraphs 19-25 are exceeded in a shorter period.

Hose Stream Test.

8(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 hose discharging through a National Standard playpipe of corresponding size equipped with a 1⅛-inch 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 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 by an amount equal to 1 foot 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 from the starting point, the hose stream shall be applied in paths about 1 foot 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.

CONDITIONS OF ACCEPTANCE

Window Assemblies.

9(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 initial closed position, shall not exceed the thickness of the frame member at any point.

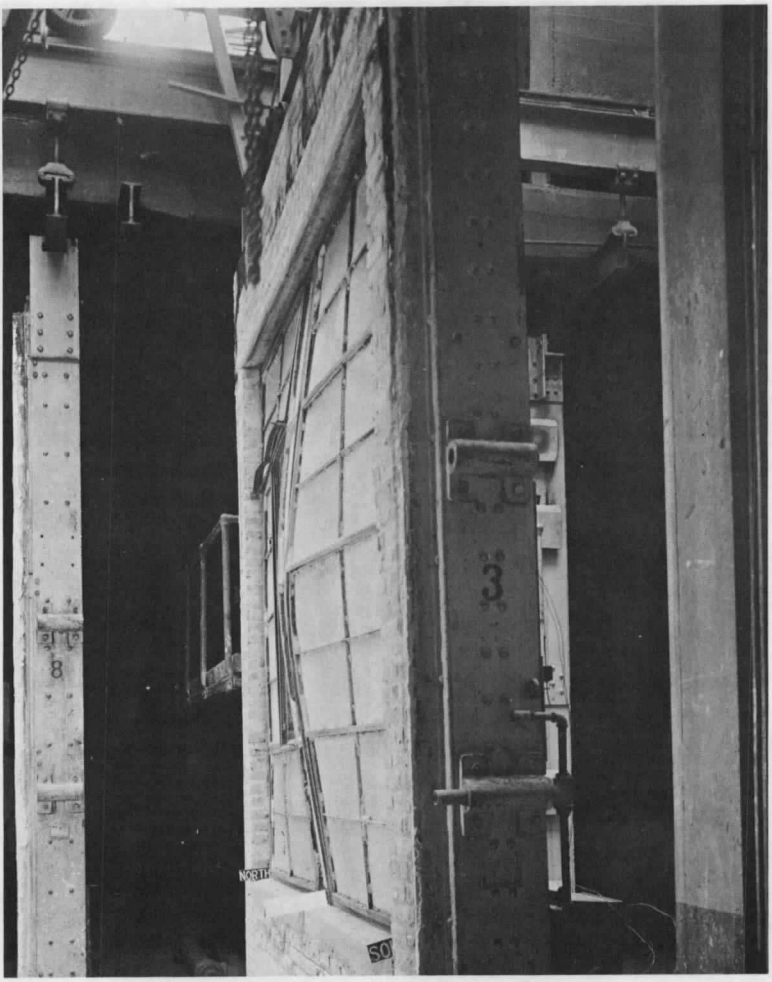
(d) At least 70 per cent of the edges of the individual glass lights shall remain in position throughout the hose stream test. The dislodging of small fragments from the central areas of individual lights shall be disregarded.

Glass Block Assemblies.

10(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 per cent of the glass blocks shall not develop through openings.



Exposed side of window assembly after fire exposure and hose stream application.

Unexposed side of window assembly after fire exposure and hose stream application.