

# Fire Test Requirements for Upholstered Furniture Used in Public Buildings

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## INTRODUCTION

In the U.S., there are two major fire safety codes: NFPA 101 Life Safety Code and the International Building/Fire Code.

Both sets of codes specify fire tests for upholstered furniture.

The fire test requirement for upholstered furniture is not normally based on the physical parameters of the building itself. The fire test requirement is dependent on the usage or “occupancy” of the building. Each code lists the various “occupancies”.

The occupancy classifications are much easier to understand in using the NFPA 101 code. Therefore, the listed occupancies are taken from the NFPA 101 code.

The occupancies listed under the International Fire Code are comparable to those listed under the NFPA 101 code except that the terminology differs.

## TABLE OF CONTENTS

<b>NFPA 101 LIFE SAFETY CODE LISTING OF OCCUPANCIES &amp; REQUIRED TESTS</b>	<b>2</b>
<b>OCCUPANCIES AS LISTED &amp; DEFINED BY THE NFPA 101 LIFE SAFETY CODE</b>	<b>2</b>
<b>NFPA 260 (COVER MATERIALS) TEST SUMMARY</b>	<b>3</b>
<b>NFPA 260 (COVER MATERIALS) TEST SKETCH</b>	<b>3</b>
<b>NFPA 260 (FILLING/PADDING COMPONENTS) TEST SUMMARY</b>	<b>4</b>
<b>NFPA 260 (FILLING/PADDING COMPONENTS) TEST SKETCH</b>	<b>4</b>
<b>NFPA 261 TEST SUMMARY</b>	<b>4</b>
<b>NFPA 261 TEST SKETCH (ACTUAL)</b>	<b>5</b>
<b>NFPA 261 TEST SKETCH (MOCKUP)</b>	<b>5</b>
<b>ASTM E1537 TEST SUMMARY</b>	<b>6</b>
<b>ASTM E1537 TEST SKETCH</b>	<b>6</b>

**NFPA 101 LIFE SAFETY CODE LISTING OF OCCUPANCIES & REQUIRED TESTS**

<b>REQUIRED TESTS BY OCCUPANCY</b>		
	<b>SPRINKLERED</b>	<b>NON SPRINKLERED</b>
Ambulatory Health Care	NFPA 260 or NFPA 261	ASTM E1537 <sup>(1)</sup>
Assembly	None	None
Business	None	None
Day-Care	None	None
Detention and Correctional	NFPA 261	NFPA 261 <sup>(2)</sup>
Dormitories	NFPA 260 or NFPA 261	ASTM E1537
Educational	None	None
Health Care	NFPA 260 or NFPA 261	ASTM E1537 <sup>(1)</sup>
Hotel	NFPA 260 or NFPA 261	ASTM E1537
Industrial	None	None
Lodging and Rooming Houses	None	None
Mercantile Occupancies	None	None
Residential Board and Care	NFPA 260 or NFPA 261	ASTM E1537 <sup>(1)</sup>
Storage	None	None

<sup>(1)</sup> The International Fire Code will accept either ASTM E1537 or California Technical Bulletin 133.

<sup>(2)</sup> The International Fire Code requires NFPA 260 or NFPA 261 plus ASTM E1537.

The information contained in this bulletin is based on the Govmark interpretation of the NFPA 101 Life Safety Code, the International Building Code, and the International Fire Code. The user is directed to the codes to make their own determination.

There are other standards issued by other jurisdictions and agencies such as California, Boston, and UFAC (Upholstered Furniture Action Council).

Contact Govmark directly for information and applicability of other upholstered furniture fire tests.

When selling to the contract market, it is highly recommended that the code requirement be considered irrespective of the occupancy.

With specific reference to large seating areas such as auditoriums and theaters (even those that are fully sprinklered), ASTM E1537 is strongly recommended.

**OCCUPANCIES AS LISTED & DEFINED BY THE NFPA 101 LIFE SAFETY CODE**

**AMBULATORY HEALTH CARE:**

An occupancy used to provide medical or other treatment or care simultaneously to four or more patients on an inpatient basis, where such patients are mostly incapable of self-preservation due to age, physical or mental disability, or because of security measures not under the occupants' control. (SAF-HEA)

**ASSEMBLY:**

An occupancy (1) used for a gathering of 50 or more persons for deliberation, worship, entertainment, drinking, eating, amusement, awaiting transportation, or similar uses; or (2) used as a special amusement building, regardless of occupant load. (SAF-AXM)

**BUSINESS:**

An occupancy used for the transaction of business other than mercantile. (SAF-MER)

**DAY-CARE:**

An occupancy in which four or more clients receive care, maintenance, and supervision, by other than their relatives or legal guardians, for less than 24 hours per day. (SAF-END)

**DETENTION AND CORRECTIONAL:**

An occupancy used to house one or more persons under varied degrees of restraint or security where such occupants are mostly incapable of self-preservation because of security measures not under the occupant's control. (SAF-DET)

**DORMITORY:**

A building or a space in a building in which group sleeping accommodations are provided for more than 16 persons who are not members of the same family in one room, or a series of closely associated rooms, under joint occupancy and single management, with or without meals, but without individual cooking facilities. (SAF-RES)

**EDUCATIONAL:**

An occupancy used for educational purposes through the twelfth grade by six or more persons for 4 or more hours per day or more than 12 hours per week. (SAF-END)

**HEALTH CARE:**

An occupancy used to provide medical or other treatment or care simultaneously to four or more patients on an inpatient basis, where such patients are mostly incapable of self-preservation due to age, physical or mental disability, or because of security measures not under the occupants' control. (SAF-HEA)

**HOTEL:**

A building or groups of buildings under the same management in which there are sleeping accommodations for more than 16 persons and primarily used by transients for lodging with or without meals. (SAF-RES)

**INDUSTRIAL:**

An occupancy in which products are manufactured or in which processing, assembling, mixing, packaging, finishing, decorating, or repair operations are conducted. (SAF-IND)

**LODGING AND ROOMING HOUSE**

A building or portion thereof that does not qualify as a one- or two-family dwelling, that provides sleeping accommodations for a total of 16 or fewer people on a transient or permanent basis, without personal care services, with or without meals, but without separate cooking facilities for individual occupants. (SAF- RES)

**MERCANTILE:**

An occupancy used for the display and sale of merchandise. (SAF-MER)

**RESIDENTIAL BOARD AND CARE:**

An occupancy used for lodging and boarding of four or more residents, not related by blood or marriage to the owners or operators, for the purpose of providing personal care services. (SAF-BCF)

**STORAGE:**

An occupancy used primarily for the storage or sheltering of goods, merchandise, products, or vehicles. (SAF-IND)

**NFPA 260 (COVER MATERIALS) TEST SUMMARY**

TEST: NFPA 260 – Standard Methods of Tests and Classification System for Cigarette Ignition Resistance of Components of Upholstered Furniture, Section 6.1 – Cover Fabric Test

SCOPE: Recognized national building codes require Class I materials in certain occupancies. Many hotel chains specify this test on a routine basis.

PURPOSE OF TEST: To measure the propensity of cover fabric to resist cigarette ignition when tested in combination with a standard foam cushioning material.

BRIEF DESCRIPTION OF TEST: Test specimens are prepared as follows:

Top Layer: Candidate cover fabric.

Bottom Layer: Standard polyurethane foam.

The test specimens are placed on a small test rig, simulating a chair back and seat. A lighted cigarette is placed in the crevice where the back and the seat of the chair meet. To intensify the heat, the cigarette is covered by a piece of cotton sheeting fabric. The test records:

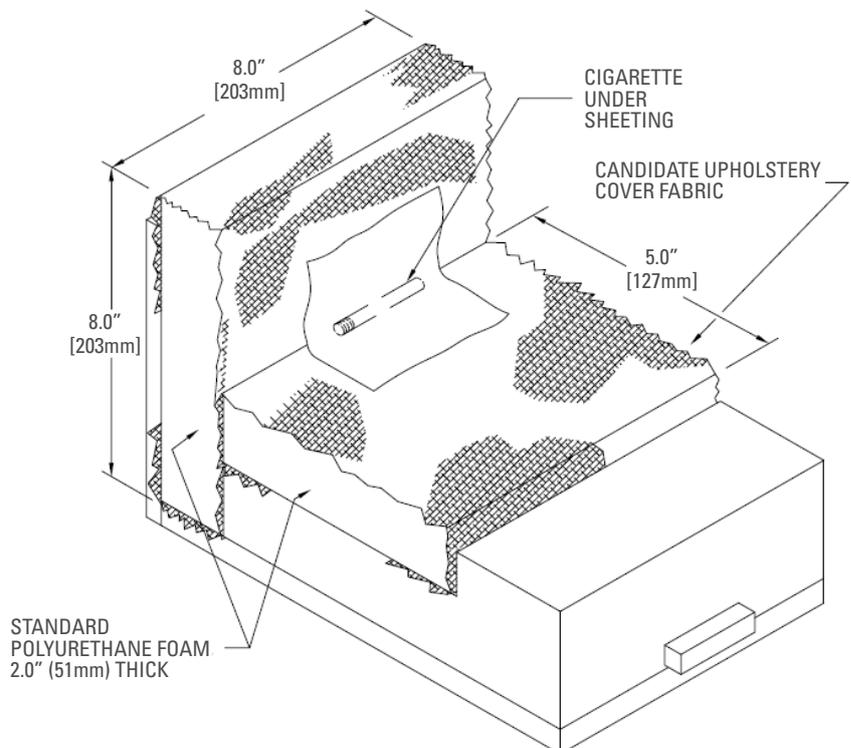
1. The extent of char (burn) length on the back section of the seat assembly.
2. Whether or not ignition has occurred.

**CLASS I VALUES:**

- |  |
|--|
| (1) Maximum char (burn) length of 45 mm<br>– AND –<br>(2) Non ignition |
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**NFPA 260 (COVER MATERIALS) TEST SKETCH**

TEST: NFPA 260 – Standard Methods of Tests and Classification System for Cigarette Ignition Resistance of Components of Upholstered Furniture, Section 6.1 – Cover Fabric Test



**NFPA 260 (FILLING/PADDING COMPONENTS) TEST SUMMARY**

TEST: NFPA 260 – Standard Methods of Tests and Classification System for Cigarette Ignition Resistance of Components of Upholstered Furniture, Section 6.1 – Filling/ Padding Component Test

SCOPE: Recognized national building codes require Class I materials in certain occupancies. Many hotel chains specify this test on a routine basis.

PURPOSE OF TEST: To measure the propensity of a filling material to resist ignition by a lighted cigarette when tested in combination with a standard upholstery cover fabric.

BRIEF DESCRIPTION OF TEST: Test specimens are prepared as follows:

- Top Layer: Standard cotton ticking material.
- Bottom Layer: Candidate filling material.

Test specimens are placed on a small test rig, simulating a chair back and seat. A lighted cigarette is placed in the crevice where the back and the seat of the chair meet. To intensify the heat, the cigarette is covered by a piece of cotton sheeting fabric. The test records:

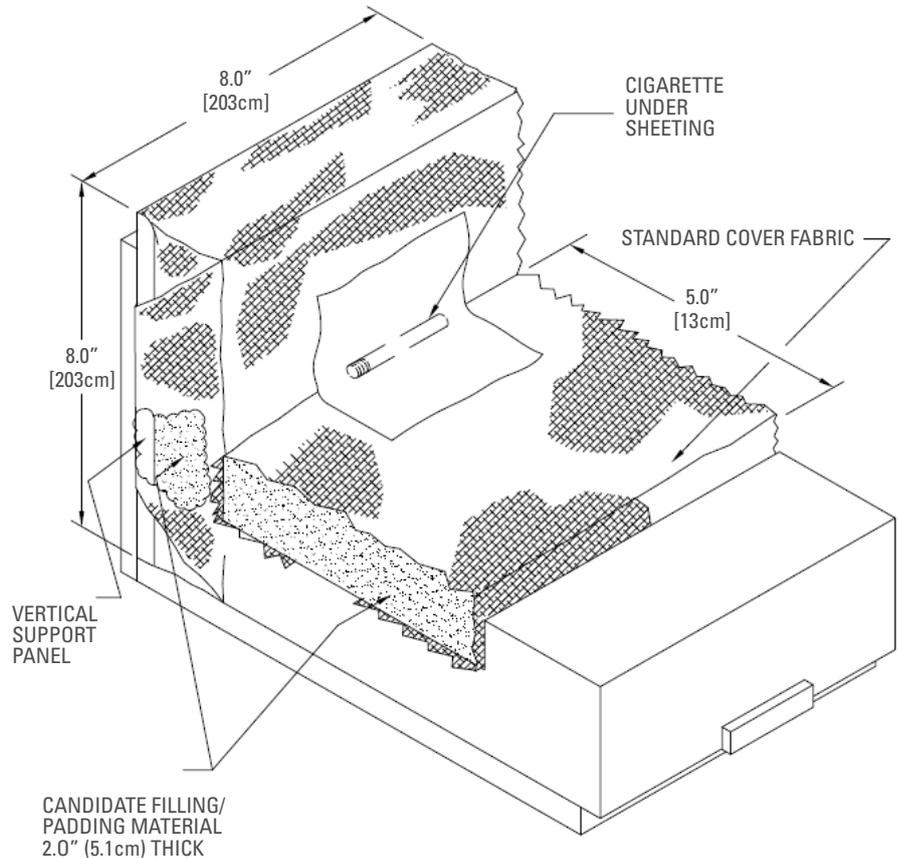
1. The extent of char (burn) length on the back section of the seat assembly.
2. Whether or not ignition has occurred.

**CLASS I VALUES:**

(1) Maximum char (burn) length of 38 mm
– AND –
(2) Non ignition

**NFPA 260 (FILLING/PADDING COMPONENTS) TEST SKETCH**

TEST: NFPA 260 – Standard Methods of Tests and Classification System for Cigarette Ignition Resistance of Components of Upholstered Furniture, Section 6.1 – Filling/ Padding Component Test



**NFPA 261 TEST SUMMARY**

TEST: NFPA 261 – Standard Method of Test for Determining Resistance of Mock-up Upholstered Furniture Material Assemblies to Ignition by Smoldering Cigarettes

SCOPE: Recognized national building codes require that upholstered furniture meet the cited Acceptance Criteria in certain occupancies. Many hotel chains specify this test on a routine basis.

PURPOSE OF TEST: To measure the propensity of a completed item of upholstered furniture to resist ignition by

a lighted cigarette left unattended on the surface of the piece of furniture.

The test procedure provides for testing a “mock-up” constructed with the actual components to be used in the seating furniture.

In Govmark’s opinion, a test of an actual piece of upholstered furniture would also satisfy the intent of the standard.

BRIEF DESCRIPTION OF TEST: An upholstered furniture “mock-up” is constructed using the actual fabrics and filling materials. Lighted cigarettes are

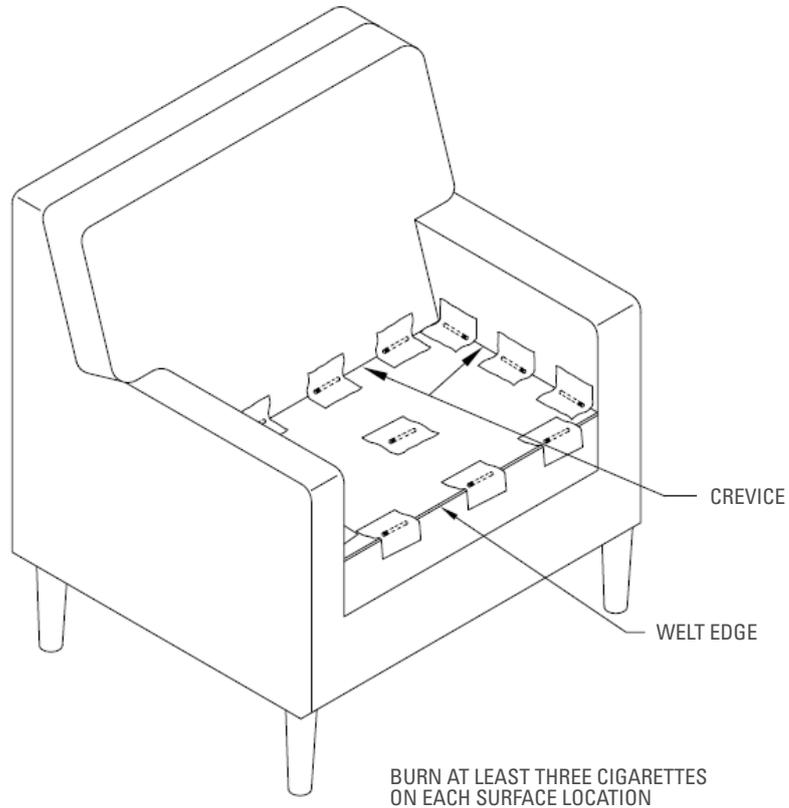
placed on different areas of the furniture surface, crevices formed by seat cushion and vertical panels, the welt edge of cushions, arm rests, tops of back, etc. To intensify the heat, the cigarettes are covered by a piece of cotton sheeting fabric. The test records the extent of burning (char length) beyond any point of the cigarettes.

BUILDING CODE ACCEPTANCE CRITERIA:

<b>MAXIMUM CHAR (BURN LENGTH)</b>
38 mm for each cigarette location

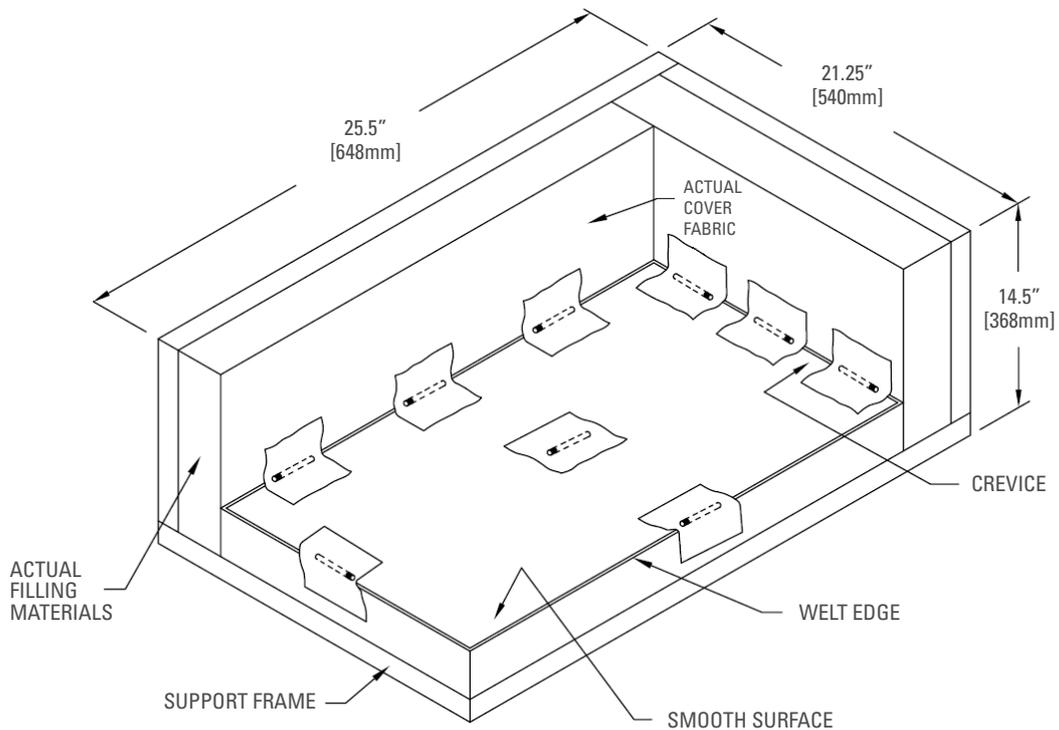
**NFPA 261 (ACTUAL) TEST SKETCH**

TEST: NFPA 261 – Standard Method of Test for Determining Resistance of Mock-up Upholstered Furniture Material Assemblies to Ignition by Smoldering Cigarettes



**NFPA 261 (MOCKUP) TEST SKETCH**

TEST: NFPA 261 – Standard Method of Test for Determining Resistance of Mock-up Upholstered Furniture Material Assemblies to Ignition by Smoldering Cigarettes



**ASTM E1537 TEST SUMMARY**

TEST: ASTM E1537 – Standard Test Method for Fire Testing of Upholstered Furniture

SCOPE: Cited by the National Building Code writing organizations, such as NFPA (National Fire Protection Agency) or ICC (International Code Council), for certain occupancies, primarily:

- (1) Healthcare
- (2) Correctional detention

PURPOSE OF TEST: To measure the fire performance characteristics of seating furniture when subjected to a large, open flame, which could result from an ongoing fire or an attempted "arson type" ignition.

BRIEF DESCRIPTION OF TEST: An actual piece of furniture (or prototype cushions made with component materials) may be tested. The test item is placed inside a room 10 ft. x 12 ft. x 8 ft. high (3 m x 3.65 m x 2.4 m). A four-sided pipe burner with multiple holes is placed in position so that it sits 1" (25 mm) above the chair seat, and is spaced 2" (50 mm) from the chair back. Gas is allowed to flow through the burner to produce a test flame that looks similar to that of a very large barbecue burner flame. The flame is applied for a period of 80 seconds. Various test measurements are taken until all burning of the test item ceases.

REPORTING CRITERIA: There are four mandatory reporting categories; however, only the heat release and total heat release maximums are specified by the building codes. The other two reporting categories, 4 ft. smoke opacity and carbon monoxide, do not have specified maximums.

BUILDING CODE ACCEPTANCE CRITERIA:

HEAT RELEASE RATE	TOTAL HEAT RELEASE
80 kW maximum	25 MJ maximum within the first 10 minutes

**ASTM E1537 TEST SKETCH**

TEST: ASTM E1537 – Standard Test Method for Fire Testing of Upholstered Furniture

