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TYPES OF BUILDING CONSTRUCTION 1975

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SHALL: is intended to indicate requirements.

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

Statement on NFPA Procedures

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Types of Building Construction

NFPA 220 — 1975

1975 Edition

The following text on Standard Types of Building Construction has been prepared by the NFPA Committee on Building Construction. The descriptions included are intended to assist in classifying the various types of building construction to standardize on the use of terms to describe these types in NFPA and other technical publications. They supersede all previous NFPA classifications which date back to 1901. This particular edition represents a complete revision. Changes include a more fundamental definition for "noncombustible," introduction of the "limited combustible" based on potential heat value limitations, and more generalized definitions for types of building construction to permit assignment of fire resistance requirements by the authority having jurisdiction based on design system needs.

History, Origin and Development

In 1952, the Committee on Building Construction secured tentative adoption of "Standard Types of Building Construction" at the NFPA Annual Meeting. At the 1954 NFPA Annual Meeting, revisions of the 1952 taenttive text were adopted by the Association, and in 1955 minor revisions were also acted upon favorably. A new definition of "noncombustibility" and editorial changes in the description of the fire resistance rating of structural members (under the definition of fire-resistive construction) were adopted at the 1956 NFPA Annual Meeting on recommendation of the Committee on Building Construction.

With the use of plastics in building construction, recommendations on the types of standard fire tests to be used in evaluating the fire safety of these materials was adopted in 1958 as Appendix A.

In 1961, Appendix B was adopted to furnish a guide to NFPA Committees, regulatory officials, and others relative to the classification of air supported structures.

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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.

Interpretation Procedure of the Committee on Building Construction

Those desiring an interpretation shall supply the Chairman with five identical copies of a statement in which shall appear specific reference to a single problem, paragraph, or section. Such a statement shall be on the business stationery of the inquirer and shall be duly signed.

When applications involve actual field situations they shall so state and all parties shall be named.

An interpretations committee will reserve the prerogative to refuse consideration of any application that refers specifically to proprietary items of equipment or devices. Generally inquiries should be confined to interpretation of the literal text or the intent thereof.

Requests for interpretations should be addressed to the National Fire Protection Association, 470 Atlantic Avenue, Boston, MA. 02210.

Contents

Standard on
Types of Building Construction

NFPA 220 — 1975

Chapter 1 General

1-1 Purpose. This Standard outlines standard types of building construction for reference by committees operating under the procedures of the National Fire Protection Association.

1-2 Scope. This Standard considers only those factors necessary to the classification of building types, so that it is necessary for the user to consider the influence of location, occupancy, exterior exposure, possibility of mechanical damage to fire protection material, and other features which may impose additional requirements for safeguarding life and property, as commonly covered in building codes.

Chapter 2 Definitions[1]

2-1 Fire resistance rating is the time, in minutes or hours, that materials or assemblies have withstood a fire exposure as established in accordance with the test procedures of *Standard Methods of Fire Tests of Building Construction and Materials* (NFPA 251 — 1972).[2]

2-2 Flame spread rating refers to numbers or classifications obtained according to the *Method of Test of Surface Burning Characteristics of Building Materials* (NFPA 255 — 1972).

2-3 Limited-combustible as applied to a building construction material, means a material, *not complying with the definition of noncombustible material*, which, in the form in which it is used, has a potential heat value not exceeding 3500 Btu per pound (8141 Kj/Kg),[3] *and* complies with one of the following paragraphs (a) or (b). Materials subject to increase in combustibility or flame spread rating beyond the limits herein established through the effects of age, moisture, or other atmospheric condition shall be considered combustible.

(a) Materials having a structural base of noncombustible material, with a surfacing not exceeding a thickness of ⅛ of an inch (3.2 mm) which has a flame spread rating not greater than 50.

(b) Materials, in the form and thickness used, other than as described in (a), having neither a flame spread rating greater than 25 nor evidence of continued progressive combustion *and* of such composition that surfaces that would be exposed by cutting through the material on any plane would have neither a flame spread rating greater than 25 nor evidence of continued progressive combustion.

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[1]These definitions apply to the materials used in the construction of buildings, but do not apply to furnishings or the contents of buildings, or to the fire hazard evaluation of materials.

[2]The fire resistance of building construction varies with the susceptibility to damage by fire of the building materials used and the degree of fire protection, if any, provided for the structural members.

[3]Gross, D. & Natrella, M. G., "Tentative Method of Test for Potential Heat of Materials in Building Fires," *Fire Test Performance*, ASTM STP 464, 1970, pp. 147–152.

2-4 Minimum hourly fire resistance rating is that degree of fire resistance deemed necessary by the authority having jurisdiction.

2-5 Potential heat value means the average value, in Btu per pound, obtained by testing a building material in accordance with the *Tentative Method of Test for Potential Heat of Materials in Building Fires* (ASTM Special Technical Publication 464, 1970, pp. 147–152).

2-6 Noncombustible material means a material which, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors, when subjected to fire or heat. Materials reported as noncombustible, when tested in accordance with the *Standard Method of Test for Noncombustibility of Elementary Materials*, ASTM E 136–73, shall be considered noncombustible materials.

Chapter 3 Types of Construction

3-1 Fire-Resistive Construction. Fire-resistive construction is that type of construction in which the structural members including walls, partitions, columns, floors, and roofs are of noncombustible or limited-combustible materials and have fire resistance ratings not less than those specified in Table 3-1.

Table 3-1

Fire Resistance Requirements for 4-hour and 3-hour Fire-Resistive Construction

Building Element	Fire Resistance Rating of Structural Members in Hours	
	Classification	
	(4-hour)	(3-hour)
Bearing walls or bearing portions of walls, exterior or interior Bearing walls and bearing partitions must have adequate stability under fire conditions in addition to the specified fire resistance rating.	4	3
Nonbearing walls or portions of walls, exterior or interior NC — Noncombustible LC — Limited-Combustible Fire resistance may be required for such walls by conditions such as fire exposure, location with respect to lot lines, occupancy, or other pertinent conditions.	NC or LC	NC or LC
Principal supporting members including columns, trusses, girders and beams for one floor or roof only	3	2
Principal supporting members including columns, trusses, girders and beams for more than one floor or roof	4	3
Secondary floor supporting members, such as the beams, slabs, and joists, not affecting the stability of the building	3	2
Secondary roof supporting members, such as beams, purlins, and slabs, not affecting the stability of the building	2	1½
Interior partitions enclosing stairways and other openings through floors One-hour partitions of noncombustible or limited-combustible materials may be permitted under certain conditions.	2	2

3-2 Noncombustible/Limited-Combustible Construction. Noncombustible/Limited-Combustible Construction is that type of construction not qualifying as Fire-Resistive Construction in which the walls, partitions, and structural members are of noncombustible or limited-combustible materials.

3-3 Protected Noncombustible/Limited-Combustible Construction. Noncombustible/Limited-Combustible Construction may be designated as "Protected" when bearing walls or bearing portions of walls, exterior or interior, are of noncombustible or limited-combustible materials and have minimum hourly fire resistance ratings and stability under fire conditions, and floors and roofs and their supports have minimum hourly fire resistance ratings.

3-4 Heavy Timber Construction.

3-4.1 Heavy Timber Construction is that type of construction in which bearing walls or bearing portions of walls are of noncombustible or limited-combustible materials and have minimum hourly fire resistance ratings and stability under fire conditions; nonbearing exterior walls are of noncombustible or limited-combustible materials; columns, beams, and girders are of heavy timber, solid or laminated; and floors and roofs are of wood without concealed spaces.[1]

Exception: As spaces are permitted in 3-4.2 (c).

3-4.2 In addition to 3-4.1, the following shall also apply, dimensions given being nominal:

(a) Wood columns supporting floor loads shall be not less than 8 inches (203 mm) in any dimension and wood columns supporting roof loads only shall be not less than 6 inches (152 mm) in least dimension and not less than 8 inches (203 mm) in depth.

(b) Wood beams and girders supporting floor loads shall be not less than 6 inches (152 mm) in width and not less than 10 inches (254 mm) in depth, and wood beams, girders, and other roof framing, supporting roof loads only, shall be not less than 4 inches in width and not less than 6 inches (152 mm) in depth.

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[1]Fire resistance may be required for nonbearing exterior walls, and fire resistance ratings are required for bearing walls or bearing portions of walls on the basis of conditions such as occupancy, location with respect to lot lines, fire exposure, and other pertinent conditions.

(c) Framed or glued laminated arches which spring from grade or the floor line and timber trusses, which support floor loads, shall be not less than 8 inches (203 mm) in width or depth. Framed or glued laminated arches for roof construction which spring from grade or the floor line, and do not support floor loads, shall have members not less than 6 inches (152 mm) in width and not less than 8 inches (203 mm) in depth for the lower half of the height and not less than 6 inches (152 mm) in depth for the upper half. Framed or glued laminated arches for roof construction which spring from the top of walls or wall abutments and timber trusses, which do not support floor loads, shall have members not less than 4 inches (102 mm) in width and not less than 6 inches (152 mm) in depth.

Exception: Spaced members may be composed of two or more pieces not less than 3 inches (76 mm) in thickness when blocked solidly throughout their intervening spaces or when such spaces are tightly closed by a continuous wood cover plate not less than 2 inches (51 mm) in thickness, secured to the underside of the members.

Splice plates shall be not less than 3 inches (76 mm) in thickness.

(d) Interior columns, arches, beams, girders, and trusses of materials other than wood shall have minimum hourly fire resistance ratings.

(e) Floors shall be constructed of splined or tongued and grooved plank not less than 3 inches (76 mm) in thickness covered with 1 inch (25 mm) tongue and groove flooring, laid crosswise or diagonally to the plank, or of laminated planks not less than 4 inches (102 mm) in width, set on edge close together, spiked at intervals of 18 inches (457 mm) and covered with 1 inch (25 mm) tongue and groove flooring laid crosswise or diagonally to the plank.

(f) Roof decks shall be of splined or tongued and grooved plank not less than 2 inches (51 mm) in thickness; or of laminated planks not less than 3 inches (76 mm) in width, set on edge close together, and laid as required for floors; or of 1⅛ inch-thick (28.6 mm) interior plywood (exterior glue); or of noncombustible or limited-combustible materials.

3-5 Ordinary Construction. Ordinary construction is that type of construction in which exterior bearing walls or bearing portions of exterior walls are of noncombustible or limited-combustible materials and have minimum hourly fire resistance ratings and stability under fire conditions; nonbearing exterior walls are of noncombustible or limited-combustible materials; and roofs, floors,

and interior framing are wholly or partly of wood of smaller dimensions than required for Heavy Timber Construction.[1]

3-6 Protected Ordinary Construction. Ordinary Construction may be designated as "Protected" when roofs and floors and their supports have minimum hourly fire resistance ratings.

3-7 Wood Frame Construction. Wood Frame Construction is that type of construction in which exterior walls, bearing walls and partitions, and floors and roofs and their supports are wholly or partly of wood or other combustible material, when the construction does not qualify as Heavy Timber Construction or Ordinary Construction.

3-8 Protected Wood Frame Construction. Wood Frame Construction may be designed as "Protected" when roof and floors and their supports have minimum hourly fire resistance ratings.

[1]Fire resistance may be required for nonbearing exterior walls and fire resistance ratings are required for bearing walls or bearing portions of walls on the basis of conditions such as occupancy, location with respect of lot lines, fire exposure and other pertinent conditions.

Appendix A

This Appendix is not a part of this NFPA Standard, but is included for information purposes only.

A-1 Reference Publications.

A-1.1 NFPA Standards. This Publication makes reference to the following NFPA Standards and the year dates shown indicate the latest editions available:

(a) NFPA 102–1972, *Standard for Tents, Grandstands, and Air-Supported Structures Used in Places of Assembly.*

(b) NFPA 251–1972, *Standard Methods of Fire Tests of Building Construction and Materials.*

(c) NFPA 255–1972, *Method of Test of Surface Burning Characteristics of Building Materials.*

A-1.2 Other Publications. This Standard makes reference to the following publications and the year date shown indicates the latest edition available:

(a) ASTM STP 464–1970, "Tentative Method of Test for Potential Heat of Materials in Building Fires," *Fire Test Performance* (pp. 147–152), American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

(b) ASTM E-136-1973, *Standard Method of Test for Noncombustibility of Elementary Materials*, American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

Appendix B. Recommendations on Plastics in Building Codes and Standards

This Appendix is not a part of this NFPA Standard, but is included for information purposes only.

This Appendix is prepared to furnish guidance to NFPA committees and for the drafting of provisions, applying to plastics, which may be used in building codes.

Small-scale fire tests may provide misleading results in evaluating plastics for building materials. It is not proper to exempt plastics from recommendations as to fire hazard characteristics which building codes and standards specify for other building materials.

The use of standard fire tests for all building materials, including plastics, is recommended, particularly those for fire resistance of structural assemblies (NFPA 251 — 1972, *Standard Methods for Fire Tests of Building Construction and Materials*) and for surface flame spread and other features (NFPA 255 — 1972, *Method of Test of Surface Burning Characteristics of Building Materials*).

Appendix C. Classification of Air Supported Structures[1]

This Appendix is not a part of this NFPA Standard, but is included for informational purposes only.

This Appendix is prepared to furnish guidance to NFPA committees, regulatory officials and others interested in the classification of air supported structures.

Air supported structures are enclosures which depend primarily on air pressure for their support. They are generally made of plastics and in most cases are directly supported by air pressure and in other cases the supports are air inflated columns, pillars or pilasters. A third type has a limited amount of structural steel supports.

The use of air for structural support raises the question of the proper classification of such structures for application of codes and standards.

These structures should *not* be classified as buildings for a number of reasons, some of which follow. Present codes and standards contemplate that the supporting members of buildings are of material such as steel, concrete and wood, which are considered to provide more dependable structural support than air pressure. Further, there is no means for supporting sprinklers, where such might be needed to protect the structure or the occupancy, nor can fire resistance ratings be readily obtained for portions of the structure which should have such ratings under certain conditions if they were classified as buildings. These factors clearly indicate that such structures cannot be made to comply with provisions normally applicable to buildings.

It is recommended that these structures be classed as tents, as they more closely resemble tents from a fire-protection standpoint and by classifying them as such, they can be made to comply with provisions applicable to tents, whether such provisions be in a building code, fire prevention code, or separate standards.

[1]See also, NFPA 102 — 1972, *Standard for Tents, Grandstands, and Air-Supported Structures Used for Places of Assembly.*