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STANDARD TYPES OF BUILDING CONSTRUCTION 1961

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STANDARD TYPES OF BUILDING CONSTRUCTION

NFPA No. 220 — May 1961

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.

History

In 1952, the present Committee on Building Construction secured tentative adoption of these "Standard Types of Building Construction" at the NFPA Annual Meeting held that year. At the 1954 NFPA Annual Meeting, revisions of the 1952 tentative text were adopted by the Association, and in 1955 minor revisions were also acted upon favorably by the Association. 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.

1961 Printing

With the use of plastics in building construction, the Committee felt it desirable to draft recommendations on the types of standard fire tests to be used in evaluating the fire safety of this material. Such a statement was adopted at the 1958 NFPA Annual Meeting and is included in this printing of NFPA No. 220 as Appendix A.

At the May 1961 NFPA Annual Meeting, Appendix B was adopted by the Association on recommendation of the Committee on Building Construction to furnish a guide to NFPA Committees, regulatory officials and others relative to the classification of air supported structures.

STANDARD TYPES OF BUILDING CONSTRUCTION

NFPA No. 220 — 1961

Introduction.

This standard outlines standard types of building construction for the guidance of committees operating under the procedure of the National Fire Protection Association.

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. Fire resistance ratings of structural members shall be determined as described in Standard Method of Fire Tests of Building Construction and Materials, NFPA No. 251. This standard is published as a pamphlet and in National Fire Codes, Vol. III, Building Construction and Equipment, by the National Fire Protection Association, 60 Batterymarch St., Boston 10, Mass.

It is also published by Underwriters' Laboratories, 207 East Ohio St., Chicago, Ill., as UL No. 263, and in prior editions by the American Society of Testing Materials, 1916 Race St., Philadelphia, ASTM No. E119.

In this standard only those factors considered necessary to the classification of building types have been included, so that it will be necessary for the user to consider the influence of location, occupancy, exterior exposure, possibility of mechanical damage to fireproofing, and other features which may impose additional requirements for safeguarding life and property, as commonly covered in detail in building codes. In addition, fire detection and extinguishing facilities, both public and private, available or to be provided, will influence the use of the terms in this standard.

This standard provides the following classifications of building types:

Fire-resistive construction
Heavy timber construction
Noncombustible construction
Ordinary construction
Wood frame construction

DEFINITION OF NONCOMBUSTIBILITY.

For some of the types of building construction classified in this standard certain elements of a building are required to be of noncombustible material or noncombustible construction. For many years there were only a few building materials that would qualify for such use. Materials such as steel, iron, brick, tile, concrete, slate, asbestos, glass and plasters were the most commonly used. These materials will not ignite and burn when subjected to fire, hence the phrase noncombustible material, by tradition, has been associated with these materials. In recent years, however, many building materials have been developed which, though not noncombustible in accordance with the traditional use of the term, are nevertheless suitable for use in building elements required to be of noncombustible material or noncombustible construction.

It is therefore suggested that wherever the standard for classification of building types refers to the use of noncombustible material or noncombustible construction, material which, in the form in which it is used, falls in one of the following groups (a) through (c) be accepted. No material shall be classed as noncombustible which is subject to increase in combustibility or flame spread rating beyond the limits herein established, through the effects of age, moisture or other atmospheric condition. Flame spread rating as used herein refers to ratings obtained according to the Method of Test of Surface Burning Characteristics of Building Materials, NFPA No. 255; Underwriters' Laboratories No. UL 723; American Society of Testing and Materials, ASTM No. E84, tentative.

(a) Materials no part of which will ignite and burn when subjected to fire.

(b) Materials having a structural base of noncombustible material, as defined in (a), with a surfacing not over ⅛ inch thick which has a flame spread rating not higher than 50.

(c) Materials, other than as described in (a) or (b), having a surface flame spread rating not higher than 25 without evidence of continued progressive combustion and of such composition that surfaces that would be exposed by cutting through the material in any way would not have a flame spread rating higher than 25 without evidence of continued progressive combustion.

FIRE-RESISTIVE CONSTRUCTION

Definition: That type of construction in which the structural members including walls, partitions, columns, floor and roof

constructions are of noncombustible materials with fire resistance ratings not less than those specified in the following table.

The two classifications are identified by the required fire resistance of floors as a matter of convenience.

Fire Resistance Rating of Structural Members in Hours	Classification	
	3-hour	2-hour
Bearing walls or bearing portions of walls, exterior or interior	4	3
Bearing walls and bearing partitions must have adequate stability under fire conditions in addition to the specified fire resistance rating.		
Nonbearing walls or portions of walls, exterior or interior	NC	NC
NC-Noncombustible. Fire resistance may be required in such walls by conditions such as fire exposure, location with respect to lot lines, occupancy or other pertinent conditions.		
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 then one floor or roof	4	3
Secondary floor construction members, such as the beams, slabs and joists not affecting the stability of the building	3	2
Secondary roof construction 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	2	2
One-hour noncombustible partitions may be permitted under certain conditions.		

HEAVY TIMBER CONSTRUCTION.

Definition: That type of construction in which bearing walls or bearing portions of walls are of noncombustible materials having a minimum fire resistance of two hours and stability

under fire conditions; nonbearing exterior walls are of noncombustible construction; columns, beams and girders are of heavy timber, solid or laminated; floor and roof construction are of wood without concealed spaces, except as permitted in paragraph (c) below. Fire resistance may be required for nonbearing exterior walls and fire resistance additional to that specified may be required in bearing walls or bearing portions of walls, by conditions such as occupancy, location with respect to lot lines, fire exposure and other pertinent conditions. (Dimensions given in the following paragraphs are nominal dimensions.)

(a) Columns, if of wood, shall be not less than 8 inches in any dimension. Beams and girders, if of wood, shall be not less than 6 inches in least dimension nor less than 10 inches in depth. Interior structural members, columns, beams, girders or trusses, of materials other than wood and having fire resistance ratings not less than 1 hour, may be substituted for heavy timber members.

(b) Floors shall be constructed of splined or tongued and grooved plank not less than 3 inches in thickness covered with 1 inch flooring, laid cross-wise or diagonally, or of laminated planks not less than 4 inches width, set on edge close together, spiked at intervals of 18 inches and covered with 1 inch flooring.

(c) Timber arches or trusses may be used to support roof loads. The framing members shall be not less than 4 inches by 6 inches, except that spaced members may be composed of two or more pieces not less than 3 inches in thickness when blocked solidly throughout their intervening spaces or when such spaces are tightly closed by a continuous wood cover plate of not less than 2 inches thickness secured to the underside of members. Splice scabs shall be not less than 3 inches thickness.

(d) Roof decks shall be of matched or splined plank not less than 2 inches thickness, or of laminated planks not less than 3 inches width, set on edge close together and laid as required for floors. Beams and girders supporting roof loads only shall be not less than 6 inches in least dimension.

(e) Interior partitions enclosing stairways and other openings through floors shall have not less than 1-hour fire resistance.

NONCOMBUSTIBLE CONSTRUCTION.

Definition: That type of construction in which the walls, partitions and structural members are of noncombustible construction not qualifying as Fire Resistive Construction.

Protected Noncombustible Construction. Noncombustible Construction may be designated Protected Noncombustible Construction when bearing walls or bearing portions of walls, exterior or interior, are of noncombustible construction having a minimum fire resistance rating of 2 hours and are stable under fire conditions; roof and floor construction and their supports have 1-hour fire resistance; and stairways and other openings through floor are enclosed with partitions having 1-hour fire resistance.

ORDINARY CONSTRUCTION.

Definition: That type of construction in which exterior bearing walls or bearing portions of exterior walls are of noncombustible construction having a minimum fire resistance of 2 hours and stability under fire conditions; nonbearing exterior walls are of noncombustible construction; and in which the roofs, floors and interior framing are wholly or partly of wood (or other combustible material) of smaller dimensions than required for Heavy Timber Construction. Fire resistance may be required for nonbearing exterior walls, and fire resistance additional to that specified may be required for bearing walls or bearing portions of walls, by conditions such as occupancy, location with respect to lot lines, fire exposure and other pertinent conditions.

Protected Ordinary Construction. Definition: Ordinary Construction may be designated Protected Ordinary Construction when roof and floor construction and their supports have 1-hour fire resistance, and stairways and other openings through floors are enclosed with partitions having 1-hour fire resistance.

WOOD FRAME CONSTRUCTION.

Definition: That type of construction in which exterior walls, bearing walls and partitions, floor and roof constructions and their supports are of wood or other combustible material, when the construction does not qualify as Heavy Timber Construction or Ordinary Construction.

Protected Wood Frame Construction. Definition: Wood Frame Construction may be designated Protected Wood Frame Construction when roof and floor construction and their supports have 1-hour fire resistance, and stairways and other openings through floors are enclosed with partitions having 1-hour fire resistance.

APPENDIX A

RECOMMENDATIONS ON PLASTICS IN BUILDING CODES AND STANDARDS

(Adopted in May 1958 as NFPA No. 220M)

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 in evaluating plastics for building materials may provide misleading results. 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 (Standard Methods for Fire Tests, NFPA No. 251, ASTM No. E-119, UL No. 263) and for surface flame spread and other features (Fire Hazard Classification, NFPA No. 255, ASTM No. E-84, UL No. 723).

(ASTM is American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. UL is Underwriters' Laboratories, Inc., 207 East Ohio St., Chicago 11, Ill.

APPENDIX B

CLASSIFICATION OF AIR SUPPORTED STRUCTURES

(Adopted in May 1961 as NFPA No. 220M-2)

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.

The NFPA Standard on Places of Outdoor Assembly, Grandstands and Tents, NFPA 102—1957, contains provisions on tents.