

## Building Classification - Part 2: Construction Types

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In my last article, I discussed the first of two types of building classifications used in the building code: Occupancies. The second, which is frequently misunderstood by new users of the building code, is the Construction Type classification. The Construction Type has little to nothing to do with the Occupancy classification. But, like the two towers of the Golden Gate suspension bridge, without both, the whole thing wouldn't hold together.

A Construction Type, as the term clearly states, is based on how the building is constructed, and the requirements are found in Chapter 6 of the *International Building Code* (IBC). Most people will relate the Construction Type to the materials used for constructing a building. But, it's a little more than that. The "little more" is called combustibility and fire-resistance.

There are a total of nine types of construction that span from noncombustible types to combustible types of construction, with varying degrees of each in between that are based on fire resistance. Table 601, *Fire-Resistance Rating Requirements for Building Elements*, shows each of the types with their respective fire-resistance requirements for building elements. These building elements include the structural frame (columns, beams, girders, trusses, and spandrels), bearing walls (i.e. walls that have imposed loads on them), nonbearing walls, floors, and roofs. The only exception is for nonbearing interior walls, which have no fire-resistance requirements unless they're required to be fire-resistive by other sections of the code. The nine types of construction are:

- Types IA and IB
- Types IIA and IIB
- Types IIIA and IIIB
- Type IV
- Types VA and VB

Construction Types IA and IB are considered noncombustible and fire-resistive, and are the direct descendents of the *Uniform Building Code's* (UBC) Type I-F.R. and Type II-F.R. (F.R. refers to "fire-resistive") construction types, respectively. The most significant difference between the IA and IB types is the level of fire-resistance required for the building elements previously discussed, with IA having a higher fire-resistance. Since both types are noncombustible, they only permit noncombustible materials. Unlike the UBC, the IBC doesn't specify what materials are considered noncombustible; that is left to testing per IBC Section 703.4. Noncombustible materials are determined through ASTM E 136 for basic, or "elementary," materials and ASTM E 84 for composite materials.

Construction Types IIA and IIB are also noncombustible, but have little to no fire-resistance. Like Type I construction, Types IIA and IIB are comparable to the former UBC Types II 1-hour and II-N. Determination of whether or not a material is noncombustible is the same as that for Type I construction. Type IIA has a minimum of 1-hour fire resistance throughout. Type IIB, although noncombustible, has no requirements for fire-resistance, unless required by other sections of the code.

Construction Types IIIA and IIIB are considered combustible. Being a combustible construction type, Type III construction permits the use of wood framing. Type III construction, like Type II construction, has little to no fire-resistance. Type IIIA requires 1-hour fire-resistance throughout except

that exterior bearing walls require no less than 2-hour fire-resistive construction. Type IIIB has no fire-resistance requirements, except for exterior bearing walls, which has the same requirement as Type IIIA.

Construction Type IV is unique. It is a combustible construction type, but it is limited to heavy timber construction. Although it is considered a combustible construction type, the exterior walls are required to be of noncombustible construction. Heavy timber construction includes columns not less than 8 inches thick, and floor and roof framing not less than 6 inches thick; all dimensions are nominal. Floors and roofs have thicker than normal construction consisting of varying layers of materials that build up to a deck of 3 to 4 inches thick, nominally.

Lastly, Types VA and VB are also combustible construction, but each is slightly less fire-resistive than the Type III construction types. For example, the exterior bearing wall fire resistance is reduced to 1-hour for Type VA and no fire resistance for Type VB.

It is important to understand, that a noncombustible building could still be classified as a Type III or V building. This is clearly stated in Section 602.1.1:

*A building or portion thereof shall not be required to conform to the details of a type of construction higher than that type, which meets the minimum requirements based on occupancy even though certain features of such a building actually conform to a higher type of construction.*

In other words, if an entire building, or part of it, is designed to the requirements of a Type IIA construction (concrete frame and masonry walls, for example), but the actual height, allowable area, and occupancy housed would only require the building to be classified as a Type IIIB, then the building will not be required to meet all the detailed requirements for the Type IIA construction.

In addition to the fire-resistance ratings indicated in Table 601, nonbearing exterior walls are required to comply with the hourly fire-resistance requirements of Table 602, *Fire-Resistance Rating Requirements for Exterior Walls Based on Fire Separation Distance*. As the title states, the requirements are based on the fire separation distance between the wall and the nearest lot line, street centerline, or an imaginary line between two buildings on the same lot. This table also begins to incorporate occupancies into the mix when determining the fire-resistance. For example, a Group M (Mercantile) occupancy with a nonbearing wall that is 20 feet from the lot line, and using Type IIA construction, is required to have a fire-resistance rating of not less than 1-hour. If it were Type IIB construction or more than 30 feet from the lot line, it would have no requirement for fire-resistance.

Like I've stated in a few of my previous code articles, you need to look closely at the footnotes in the tables. In Table 601, there's a footnote that permits the substitution of the 1-hour fire-resistive construction (excluding exterior walls) with the installation of an automatic sprinkler system in Construction Types IIA, IIIA, and VA. There is a catch, though...if the sprinkler is required by another section of the code, then this substitution can not be used; nor can it be used if the sprinkler system is used for an area increase (a subject that will be covered in next month's article).

Additionally, there's a footnote that permits the use of fire-retardant-treated wood in Type I and II roof construction (including girders and trusses) as long as the building 1) is two stories or less in height, 2) is Type II construction over two stories, or 3) is Type I construction over two stories and the vertical distance from the upper floor to the roof is 20 feet or more.

Construction Types and Occupancy Groups establish the foundation upon which the majority of the building code is built. Occupancy Groups drive egress, floor area, building height, among other requirements. Likewise, Construction Types also affect building materials, floor area, building height, and many other requirements. As you've probably noticed, building area and height are tied to both Construction Types and Occupancy Groups...like the suspension part of the Golden Gate Bridge mentioned at the beginning. In my next article, we'll look at how the IBC has changed the method of determining allowable area and height...so get your calculators ready!

*To comment on this article, suggest other topics, or submit a question regarding codes, contact the author at [ron@specsandcodes.com](mailto:ron@specsandcodes.com).*

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