



Date: December 1, 2023
To: City of Houston HPW-HPC
Attention: CCM
From: Jensen Hughes
Subject: Fire Resistance Rating of Roof Assemblies

This technical memo is provided to describe the new changes to the Houston Construction Codes with regards to the requirements for the fire resistance rating of roof assemblies.

The minimum required fire-resistance ratings for the building elements of those structures classified as one of the new construction types (Types IV-A, IV-B and IV-C) have been established as set forth in **Table 601**. The minimum required fire-resistance ratings set forth in the table for Type IV-A, IV-B and IV-C buildings were established in a manner consistent with the development of height and area limits for these new construction types. Correlations between the maximum building sizes and the various types of construction were established, then further evaluation addressed any unique conditions that needed to be addressed.

The term “secondary member” was revised to “secondary structural member.” Structural members not having direct connections to the columns, members of the floor construction and roof construction not having direct connections to the columns, and bracing members that not designated as part of a primary structural frame or bearing wall are all consider secondary structural members.

Footnote c in **Table 601** has historically allowed the use of heavy timber in lieu of the 1-hour rated roof construction that is required for many construction types. Because there is a separate row in the table addressing primary structural frame elements, its application to such elements has been in question. The footnote has been modified such that all components of the roof construction, including any structural frame members, may consist of heavy timber. The addition of footnote g, applicable only to Type IV-HT construction, now requires heavy timber interior bearing walls supporting more than two floors, or a floor and a roof, to be fire-resistance-rated for at least 1 hour. With its application typically utilized for vertical elements in mid-rise buildings, this mandate may result in an increase in wall thickness in exposed heavy timber interior bearing walls supporting multiple stories in order to provide the minimum 1-hour rating.

In the fifth row, Table 602 is relocated to Table 705.5 to address general exterior walls requirements, and it was revised to include new mass timber construction types. Section 705 establishes exterior wall requirements. In **Section 2304.11.2**, the minimum construction requirements for interior walls and partitions are provided in this section.

The fire-resistance rating of the mass timber elements consists of the fire-resistance rating of the unprotected element added to the protection time of the noncombustible protection. Guidance on fire resistance ratings can be found in IBC Section 722.7.

memo.

2021 Houston Building Code Changes –

**TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS).**

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV				TYPE V	
	A	B	A	B	A	B	A	B	C	HT	A	B
Primary structural frame ^f (see Section 202)	3 ^{a, b}	2 ^{a, b, c}	1 ^{b, c}	0 ^c	1 ^{b, c}	0	3 ^a	2 ^a	2 ^a	HT	1 ^{b, c}	0
Bearing walls												
Exterior ^{e, f}	3	2	1	0	2	2	3	2	2	2	1	0
Interior	3 ^a	2 ^a	1	0	1	0	3	2	2	1/HT ^g	1	0
Nonbearing walls and partitions Exterior	See Table 602 705.5											
Nonbearing walls and partitions Interior ^d	0	0	0	0	0	0	0	0	0	See Section 602.4.8 2304.11.2	0	0
Floor construction and associated secondary structural members (see Section 202)	2	2	1	0	1	0	2	2	2	HT	1	0
Roof construction and associated secondary structural members (see Section 202)	1½ ^b	1 ^{b, c}	1 ^{b, c}	0 ^c	1 ^{b, c}	0	1½	1	1	HT	1 ^{b, c}	0

For SI: 1 foot = 304.8 mm.

- a. Roof supports: Fire-resistance ratings of primary structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.
- b. Except in Group F-1, H, M and S-1 occupancies, fire protection of structural members in roof construction shall not be required, including protection of primary structural frame members, roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant-treated wood members shall be allowed to be used for such unprotected members.
- c. In all occupancies, heavy timber complying with Section 2304.11 shall be allowed for roof construction, including primary structural frame members, where a 1-hour or less fire-resistance rating is required.
- d. Not less than the fire-resistance rating required by other sections of this code.
- e. Not less than the fire-resistance rating based on fire separation distance (see Table 705.5).
- f. Not less than the fire-resistance rating as referenced in Section 704.10.
- g. Heavy timber bearing walls supporting more than two floors or more than a floor and a roof shall have a fire resistance rating of not less than 1 hour.



2304.11.2 Partitions and Walls. Partitions and walls shall comply with Section 2304.11.2.1 or 2304.11.2.2.

2304.11.2.1 Exterior walls. Exterior walls shall be permitted to be cross-laminated timber not less than 4 inches (102 mm) in thickness meeting the requirements of Section 2303.1.4.

2304.11.2.2 Interior walls and partitions. Interior walls and partitions shall be of solid wood construction formed by not less than two layers of 1-inch (25 mm) matched boards or laminated construction 4 inches (102 mm) thick, or of 1-hour fire-resistance-rated construction.

