1

2

Course Description

- This seminar addresses the key issues of the 2018 *International Building Code*® (IBC®) regarding the proper classification of buildings for **type of construction**.
- The process for correctly evaluating a building for code compliance relies on a systematic approach to the determination of occupancy classification and construction type.

2018 IBC Types of Construction and Application 3

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3

Course Description

- Everything starts with the correct building classification!
- A clear understanding of the classification process provides the groundwork for the proper application of many other important code provisions.

2018 IBC Types of Construction and Application 4

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Course Description

- Type of construction classification consists of two distinct aspects:
  - Determination of the appropriate types of construction based on the building's occupancy, height and floor area, and
  - Identification of the construction and fire-resistance-rated features associated with those appropriate types of construction as previously determined.
- This seminar focuses on the identification of such features primarily found in Chapter 6.

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Goal

- Participants will be able to use Chapter 6 to determine the specific features of the nine types of construction.

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Objectives

Upon completion, participants will be better able to:

1. Understand the concept behind the use of construction type to regulate a building's design and construction.
2. Identify the characteristics of the nine types of construction set forth in the 2018 IBC.
3. Identify those allowances where combustible materials are permitted in Type I and II buildings.

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7

Course Outline

- Module 1 — Concept and Process of Type of Construction Classification
- Module 2 — Process for Determination of Construction Type
- Module 3 — Details of Construction Type Based on Materials of Construction
- Module 4 — Details of Construction Type Based on Fire-Resistive Construction
- Module 5 — Combustible Materials in Type I and Type II Construction

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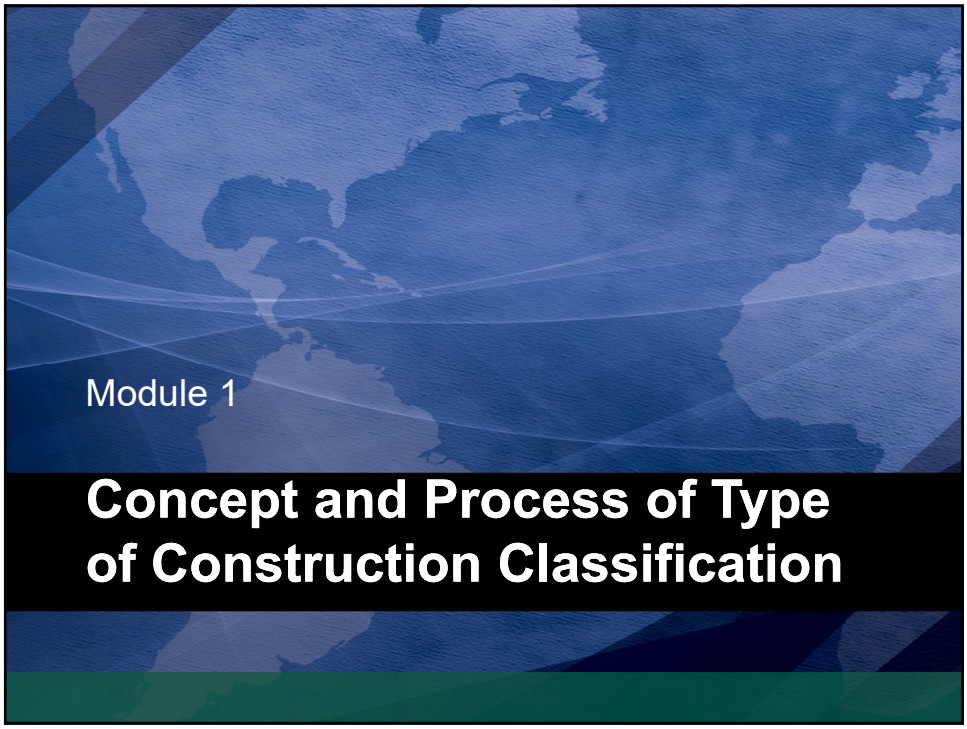
8



9

Concept of Building Classification

- Concepts and applications related to type of construction are primarily focused on one simple mandate:
  - In order to build a structure bigger, it must be built better.
  - Where a building is required to have greater floor area and/or height, the materials of construction and/or fire-resistive protection of building elements are regulated to address the increased hazards inherit in larger structures.
  - Type of construction provisions of Chapter 6 are directly related to allowable height and area provisions of Chapter 5.

10

Concept of Building Classification

- In addition, the type of construction is regulated based on the occupancy or occupancies housed within the building.
- As the hazards increase due to the building's uses, the available types of construction may become more limited.
- The presence of sprinkler protection and/or substantial building frontage may increase the types of construction that are available to the designer.

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11

Concept of Building Classification

- In the design of the building, various options regarding construction type are available.
- Such options can be divided into two major categories:
  - Materials of construction (contribution to fire load)
  - Fire-resistance-rated protection of building components

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12

Concept of Building Classification

- Materials of construction that impact the building's construction type can be divided into three general categories, with exceptions:
  - Noncombustible throughout
  - Noncombustible exterior walls, with combustible and noncombustible materials permitted within such walls
  - Combustible and noncombustible materials permitted throughout
- The presence of combustible materials as a part of the building's construction contribute to the fire load, resulting in an increased hazard level.

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13

Concept of Building Classification

- Provisions of Chapter 6 in regard to fire resistance are intended to address the structural integrity of the building under fire conditions.
- Unlike fire separations, whose intent is to safeguard against the spread of fire, the protection afforded by Chapter 6 is almost solely that of structural integrity.
  - Some degree of vertical compartmentation is also addressed in multi-story buildings through the required protection of vertical openings and penetrations.

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14

Concept of Building Classification

- Fire-resistance-rated construction is selectively mandated for type of construction purposes, with potential ratings of:
  - 3 hours
  - 2 hours
  - 1 hour
  - Nonrated
- These hourly ratings increase selectively based on the hazards related to building size and use.

15

Concept of Building Classification

- Although owner/architect would prefer that all options are available, as building becomes larger and/or more hazardous, available choices become limited.

16

Concept of Building Classification

- A building can be assigned only **one** type of construction.
- A building must fully comply with the provisions of Section 602 (materials of construction) and Table 601 (fire-resistance-ratings of building elements) in order to be classified for construction type.
- A single structure may contain multiple buildings, thus providing for multiple types of construction, under limited circumstances:
  - Fire wall separations
  - Horizontal building separations

17

Concept of Building Classification

- A building or portion thereof is not required to conform to details of a type of construction higher than that type which meets the minimum requirements, even though certain features conform to a higher type.
  - Conversely, a building may be classified to a higher level that required where it complies with all aspects of the higher construction type (design decision).

18

Concept of Building Classification

- The IBC establishes 9 types of construction, based on a combination of the combustibility and fire-resistive protection of the building's elements:
  - Types IA and IB
  - Types IIA and IIB
  - Types IIIA and IIIB
  - Type IV-HT
  - Types VA and VB
- Each construction type is unique in its requirements as established in Chapter 6.

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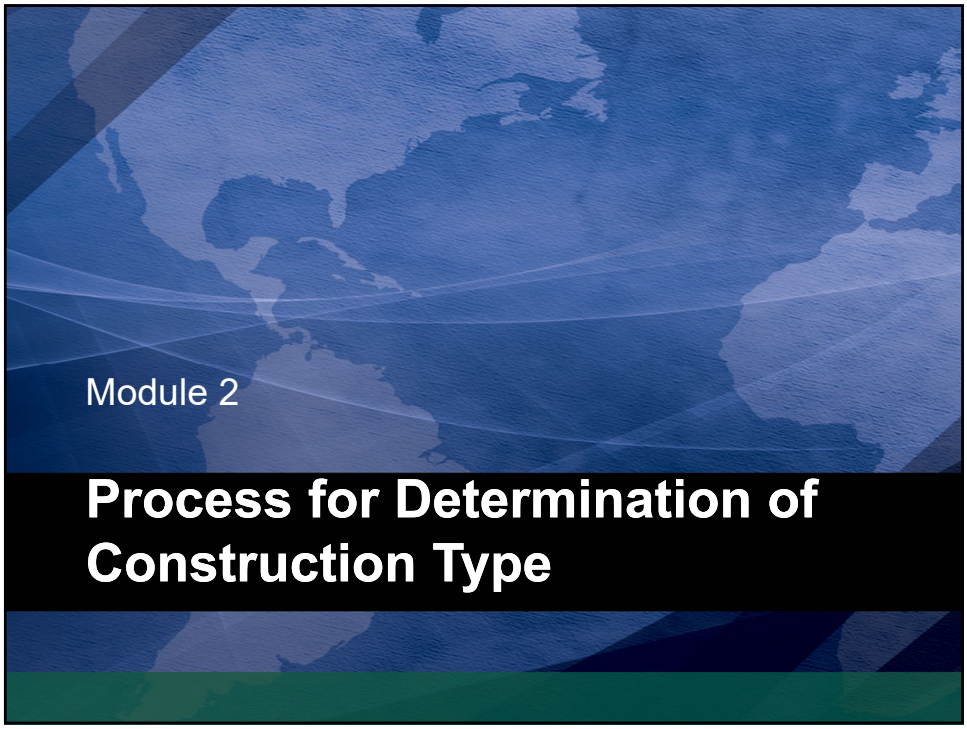
19



20

Process of Building Classification

- Prior to addressing the specific details of each of the nine construction types, it is necessary to briefly explore the process to identify how the acceptable types of construction are determined for a specific building.
- This process is primarily established in Chapter 5 dealing with allowable building heights and areas.

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21

Process of Building Classification

- The initial determination in the classification of construction type is made by the designer through the identification of their preference.
- Such preference is typically Type VB construction, as it allows for the most flexibility in the design of the building due to:
  - No structural fire-resistance required
  - No limit on materials of construction

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22

Process of Building Classification

- Where Type VB construction is not acceptable due to the building's size and occupancy, other options are available.
- Each construction type has its height and area limited based on the occupancy (occupancies) within the building.
  - The designer then selects the complying construction type that best meets their design and budgetary needs.

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23

Process of Type of Construction

- This process requires the designer to determine the allowable height and allowable area for the desired construction type in order to verify compliance.
- Only when the allowable height and area as established by the code are not exceeded is the corresponding type of construction acceptable.

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24

Determining Type of Construction

- The provisions of Chapter 5 provide the basis for determining compliant construction types based on:
  - Building height in feet above grade plane
  - Building height in stories above grade plane
  - Building area, as well as floor area per story
  - Application of mixed occupancy conditions
  - Unlimited area allowances (often unlimited type of construction)
  - Fire wall and podium building application

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25

Determination of Allowable Height and Area—Introduction

- Although a number of buildings can be evaluated quickly, it is typically a bit more complex to verify compliance with the height and area limitations.
- It most cases, it is necessary to utilize the allowable height and area tables (along with permitted increases) to determine the limitations on building size.
  - This determination identifies those types of construction permissible for the building under consideration.

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26

Allowable Height and Area Tables 504.3, 504.4 and 506.2

- Tables 504.3, 504.4 and 506.2 are used in establishing "equivalent risk"—offsetting a building's inherent fire hazard—represented by group—with materials and construction features.

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27

Allowable Height in Feet Above Grade Plane (Table 504.3)

TABLE 504.3
ALLOWABLE BUILDING HEIGHT IN FEET ABOVE GRADE PLANE[a]

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
A, B, E, F, M, S, U	NS[b]	UL	160	65	55	65	55	65	50	40
	S	UL	180	85	75	85	75	85	70	60
H-1, H-2, H-3, H-5	NS[c, d]	UL	160	65	55	65	55	65	50	40
	S									
H-4	NS[c, d]	UL	160	65	55	65	55	65	50	40
	S	UL	180	85	75	85	75	85	70	60
I-1 Condition 1, I-3	NS[d, e]	UL	160	65	55	65	55	65	50	40
	S	UL	180	85	75	85	75	85	70	60
I-1 Condition 2, I-2	NS[d, e, f]	UL	160	65	55	65	55	65	50	40
	S	UL	180	85						
I-4	NS[d, g]	UL	160	65	55	65	55	65	50	40
	S	UL	180	85	75	85	75	85	70	60
R[b]	NS[d]	UL	160	65	55	65	55	65	50	40
	S13D	60	60	60	60	60	60	60	50	40
	S13R	60	60	60	60	60	60	60	60	60
	S	UL	180	85	75	85	75	85	70	60

For SI: 1 foot = 304.8 mm.
UL = Unlimited; NS = Buildings not equipped throughout with an automatic sprinkler system; S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1; S13R = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2; S13D = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.3.

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28

REFER TO CODE BOOK

Allowable Height in Stories Above Grade Plane (Table 504.4)

TABLE 504.4[a, b]
ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
A-1	NS	UL	5	3	2	3	2	3	2	1
	S	UL	6	4	3	4	3	4	3	2
A-2	NS	UL	11	3	2	3	2	3	2	1
	S	UL	12	4	3	4	3	4	3	2
A-3	NS	UL	11	3	2	3	2	3	2	1
	S	UL	12	4	3	4	3	4	3	2
A-4	NS	UL	11	3	2	3	2	3	2	1
	S	UL	12	4	3	4	3	4	3	2
A-5	NS	UL	UL	UL	UL	UL	UL	UL	UL	UL
	S	UL	UL	UL	UL	UL	UL	UL	UL	UL
B	NS	UL	11	5	3	5	3	5	3	2
	S	UL	12	6	4	6	4	6	4	3
E	NS	UL	5	3	2	3	2	3	1	1
	S	UL	6	4	3	4	3	4	2	2
F-1	NS	UL	11	4	2	3	2	4	2	1
	S	UL	12	5	3	4	3	5	3	2
F-2	NS	UL	11	5	3	4	3	5	3	2
	S	UL	12	6	4	5	4	6	4	3
H-1	NS[c, d]	1	1	1	1	1	1	1	1	NP
	S									

Only a portion of Table 504.4 is shown above

2018 IBC Types of Construction and Application 29

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29

REFER TO CODE BOOK

Allowable Area Factor in Square Feet (Table 506.2)

TABLE 506.2[a, b]
ALLOWABLE AREA FACTOR (A_t = NS, S1, S13R, or SM, as applicable) IN SQUARE FEET

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
A-1	NS	UL	UL	15,500	8,500	14,000	8,500	15,000	11,500	5,500
	S1	UL	UL	62,000	34,000	56,000	34,000	60,000	46,000	22,000
	SM	UL	UL	46,500	25,500	42,000	25,500	45,000	34,500	16,500
A-2	NS	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000
A-3	NS	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000
A-4	NS	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000
A-5	NS	UL	UL	UL	UL	UL	UL	UL	UL	UL
	S1									
	SM									
B	NS	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000
	S1	UL	UL	150,000	92,000	114,000	76,000	144,000	72,000	36,000
	SM	UL	UL	112,500	69,000	85,500	57,000	108,000	54,000	27,000
E	NS	UL	UL	26,500	14,500	23,500	14,500	25,500	18,500	9,500
	S1	UL	UL	106,000	58,000	94,000	58,000	102,000	74,000	38,000
	SM	UL	UL	79,500	43,500	70,500	43,500	76,500	55,500	28,500

NS = Nonsprinklered

S1 = Sprinklered 1-story

SM = Sprinklered Multistory

S13R = NFPA 13R System

S13D = NFPA 13D System

Only a portion of Table 506.2 is shown above

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30

Allowable Building Size Section 504

- When starting the process of determining a building's allowable height and area, it is often more efficient to first look at the building's height.
- If the building complies with both the allowable height in feet and the allowable height in stories, then the evaluation of allowable building area can be undertaken.
- The building is deemed compliant only if all three limitations on building size are not exceeded.

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31

Mixed Occupancies Section 508

- Three options established in Section 508 to address mixed-occupancy buildings include:
  - Accessory Occupancies.
  - Nonseparated Occupancies.
  - Separated Occupancies.
- Methods for determining maximum allowable size, height and area and separations are identified for each option.
- One of the three options must be applied to a mixed-occupancy condition.

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32

Mixed Occupancies Section 508

- Occupancy Classification
  - Proper occupancy classifications determined - Section 302.
  - Two or more different occupancies - Section 508.
- **Allowable Building Height and Area**
  - Final analysis for allowable building height and area cannot be done until one of the three mixed-occupancy options has been chosen.
- Separation
  - Separation is not required between occupancies; or
  - Some degree of fire-resistance-rated separation is mandated to isolate one occupancy from another.

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33

Unlimited Height and Area

- It should be noted that in many cases, unlimited height or area conditions are more correctly considered as unlimited in type of construction.
- Where the maximum height and/or area is unregulated for special industrial occupancies and unlimited area buildings, it accordingly results in no limitations on a building's type of construction.
  - In some situations, construction type may be limited to specific types, but typically fire-resistance-rated protection is not required.

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34

Unlimited Area Buildings Section 507

- The provisions of Section 507 allow for buildings with large floor areas to be constructed with no requirement for:
  - Fire-resistance-rated construction, or
  - Fire walls.
- Risks have been addressed to the point that the regulation for allowable area is unnecessary.

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35

Unlimited Area Buildings Section 507

- The combination of limited height, low-to-moderate hazard uses, full sprinkler protection and significant fire department access from the exterior severely reduces the potential fire severity to a level that the allowance for unlimited area is reasonable.

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36

Fire Walls
Section 503.1

- Each portion of a building separated by one or more complying fire walls to be considered a separate building for:
  - Building area limitations
  - Building height limitations
  - Type of construction classification

37

Special Provisions
Section 510.1

- Section 510 allows for modifications or exceptions to the general requirements for building areas and heights, taking precedence over any general provisions that may apply.
- Because Section 510 permits, rather than requires the use of its special conditions, the provisions are *optional*.

38

Horizontal Building Separation Section 510.2

- A common application of Section 510 is found in Section 510.2 addressing horizontal building separation.
  - The benefit of Section 510.2 is the ability to create two separate buildings, one above the other, for the purpose of applying several specific code provisions independently to each building.
- The allowance is similar in application to the use of a fire wall, but in a vertical arrangement rather than horizontal.

39

Horizontal Building Separation Section 510.2

Referred to as “podium” or “pedestal” buildings, they may be viewed as separate buildings above and below the required fire separation for these purposes:

- **Determination of allowable area limits.**
- Continuity of fire walls.
- **Limitation on number of stories.**
  - Allowable height in feet measured from grade plane.
- **Type of construction.**

40

Special Provisions Section 510

- Similar allowances for various occupancy combinations provided with horizontal building separations are also found in Section 510:
  - Group S-2 enclosed parking garage with open parking garage above
  - Parking beneath Group R
  - Open parking garage beneath Groups A, I, B, M and R
  - Group B or M buildings with Group S-2 open parking garage above

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41

Process of Type of Construction

- Once the type of construction is selected for the building, the provisions of Chapter 6 (and other applicable provisions throughout the IBC) will regulate the building's structural fire-resistance and use of appropriate materials.

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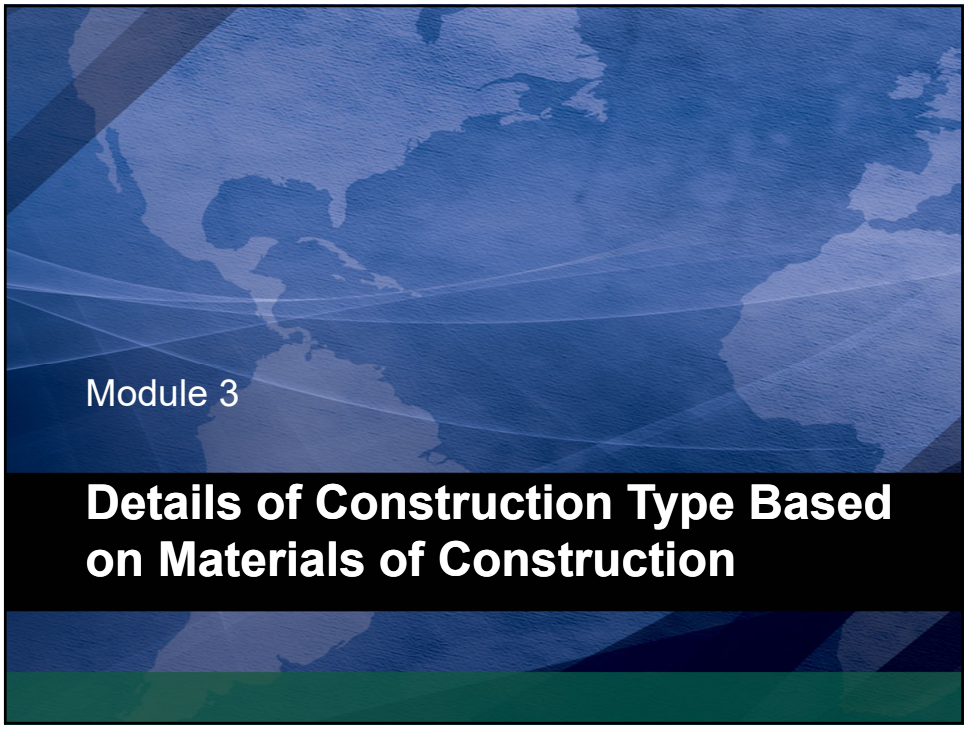
42



43

Type of Construction Section 602.1

- A building shall be assigned a type of construction as defined in Sections 602.2 through 602.5 addressing five general types of construction:
  - Type I
  - Type II
  - Type III
  - Type IV
  - Type V

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44

General Provisions Section 602

- These five general groupings are further divided to create a total of nine construction types.

Noncombustible	Exterior and interior (bearing and nonbearing) walls, floors, roofs and structural frame elements to be of noncombustible materials	I	A	B
		II	A	B
Combustible and/or noncombustible	Exterior walls to be of noncombustible materials	III	A	B
		IV	HT	
	Any materials permitted by the code	V	A	B

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Types I and II Construction Section 602.2

- Buildings classified as Type I and II construction are those types of construction in which the building elements listed in Table 601 are of noncombustible materials.
  - Primary structural frame
  - Bearing walls
  - Nonbearing walls
  - Floor construction
  - Roof construction

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46

Noncombustible Materials Section 703.5

- The acceptability of noncombustible materials as required for Type I, II, III and IV construction is based on tests as established in either:
  - Section 703.5.1 Elementary materials
  - Section 703.5.2 Composite materials

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47

Elementary Materials Section 703.5.1

- Materials required to be noncombustible to be tested in accordance with ASTM E136.
- Conditions of test consider that materials will not:
  - Aid in combustion, or
  - Add appreciable heat to a fire
- Materials passing test are permitted limited flaming

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48

Composite Materials Section 703.5.2

- Materials shall be acceptable as "noncombustible" where three conditions are met:
  - Structural base of noncombustible material as determined in accordance with Section 703.5.1, and
  - Surfacing material not more than 1/8-inch in thickness, and
  - Surfacing material has a maximum flame spread index of 50.

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49

Types I and II Construction Section 602.2

- The use of specified combustible materials is permitted by Section 603.
- As an example, and specific to Type I and II buildings, the use of fire-retardant-treated (FRT) wood is permitted, with limitations, in:
  - Nonbearing partitions
  - Nonbearing exterior walls
  - Roof construction
  - Balconies, porches, decks and exterior stairways

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50

Types I and II Construction Table 601, note c

- Heavy timber complying with Section 2304.11 is permitted for roof construction in all occupancies where a 1-hour or less fire-resistance rating is required.
  - Provides for use of heavy timber in roof construction of buildings of Types IB, IIA and IIB construction.
- Allows for use of combustible roof members in buildings of Type I or II construction.

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51

Type III Construction Section 602.3

- In Type III buildings, exterior walls to be of noncombustible materials.
  - Fire-retardant-treated wood framing and sheathing permitted within exterior wall assemblies where wall rating is $\geq$ 2 hours
- Interior elements of Type III buildings to be of any materials permitted by IBC

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52

Type IV Construction Section 602.4

- In Type IV-HT buildings, exterior walls to be of noncombustible materials.
  - Fire-retardant-treated wood framing and sheathing permitted within exterior wall assemblies where wall rating is ≥ 2 hours
  - Cross-laminated timber (CLT) is also permitted where:
    - Minimum 6 inches in thickness, and
    - Fire rating of 2 hours or less, and
    - Exterior surface of CLT protected by:
      - Minimum 15/32-inch-thick FRT wood sheathing, or
      - Minimum ½-inch-thick gypsum board, or
      - Noncombustible material

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53

Type IV Construction Section 602.4

- Interior elements of Type IV-HT buildings to be:
  - Solid wood
  - Laminated wood
  - Heavy timber HT
  - Structural composite lumber (SCL)
- Concealed spaces are not allowed within such wall elements
- In addition, one-hour fire-resistance-rated construction is permitted for interior walls and partitions
  - Based on Table 601 and Section 2304.11.2

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54

Heavy Timber Construction Section 2304.11

- Where Type IV-HT construction requires or permits the use of heavy timber structural members, the details of Section 2304.11 will apply, with criteria for:
  - Columns
  - Floor framing
  - Roof framing
  - Partitions and walls
  - Floors
  - Roof decks

55

Heavy Timber Construction Section 2304.11

- All heavy-timber elements must meet the conditions of Table 2304.11, including a minimum size of solid sawn members as follows:
  - 8” x 8” columns where supporting floor loads.
  - 6” x 8” columns where supporting only roof and ceiling loads.
  - 6” x 10” beams and girders.
  - 6” x 8” for roof supports.
  - 3” thick sawn or plank floors.
  - 2” thick sawn or plank roof decks.

56

Type V Construction Section 602.5

- In Type V buildings, structural elements, exterior walls and interior walls may be constructed of any materials permitted by the IBC.

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57

Stairway Construction Section 1011.7

- Stairways to be built of materials consistent with the types permitted for the building's type of construction, except that wood handrails are permitted for all construction types.
  - Noncombustible stairways required in Type I and II buildings
  - Noncombustible or combustible stairways permitted in Type III, IV and V buildings.

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58

59

Fire-Resistance Ratings

- A significant aspect of classifying buildings based on type of construction is the degree of fire-resistance-rated protection assigned to the various building elements.
- The minimum fire-resistance ratings required for the various types of construction are primarily established in Table 601.
  - In addition, fire-resistance for Type IV-HT buildings is established by the minimum required dimensions for heavy timber members as set forth in Table 2304.11.

60

Type of Construction Table 601

- Building elements addressed in Table 601 for fire-resistance include:
  - Primary structural frame members
  - Bearing walls (both interior and exterior)
  - Floor construction
  - Roof construction
- Fire-resistance shall be required because of its:
  - Contribution to structural stability/integrity
    - Types IA, IB, IIA, IIIA, IV and VA
  - Perimeter containment/resistance under fire conditions
    - Types IIIA, IIIB and IV

61

Primary Structural Frame Section 202

- Where the fire resistance of primary structural frame elements is required by Table 601, it is important to identify which structural members fall into that category. The primary structural frame is:
  - Columns.
  - Girders, beams, trusses and spandrels connecting directly to the columns.
  - Members of the floor and roof construction that have direct connection to the columns
  - Bracing members essential to the vertical stability of the primary structural frame under gravity loading.

62

Section 704.2 – Column protection

- Columns are to be protected by individual encasement on all sides for the full height of the column.
  - Exception for light-frame construction per Sec. 704.4.1
- Where column extends through a ceiling membrane, the individual encasement protection must be provided in a continuous manner from the top of the foundation or floor/ceiling assembly below to the top of the column.

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63

Section 704.3 – Protection of the primary structural frame other than columns

- Girders, trusses, beams, lintels and other primary structural frame members that are required to have a fire-resistance rating shall be individually protected if they support more than:
  - Two floors;
  - One floor and a roof;
  - A load-bearing wall or
  - Two stories of a non load-bearing wall.

2018 IBC Fire & Smoke Protection Features 64

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64

Section 704.3 – Protection of the primary structural frame other than columns

Primary structural members required to have a fire-resistance rating and do not support more than 2-stories, one floor and roof, load bearing wall or 2-stories of non-load bearing wall shall be protected by any one of the following:

- Individual encasement; or
- Membrane or ceiling protection in accordance with Section 711; or
- Combination of both.

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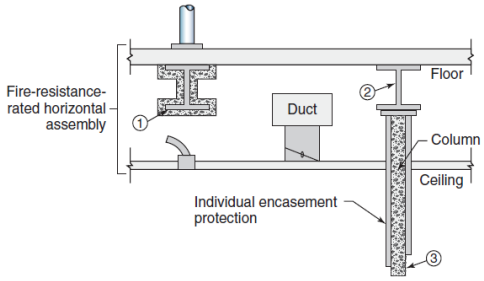
65

Section 704.3 – Protection of the primary structural frame other than columns



Code requirements:

1. Individual protection for structural members, other than columns, is required if supporting loads are from more than two floors or from more than one floor and roof.
2. Otherwise, protection may be by individual encasement, membrane or ceiling protection in accordance with Section 711 or combination of both
3. Columns must be individually encased and protected for full height. (Section 704.2)

2018 IBC Fire & Smoke Protection Features 66

LEARNING center

66

Secondary Members Section 202

- All other members are considered as secondary members and are only regulated for fire resistance for the building element in which they are located, including:
  - Structural members that do not have direct connections to the columns.
  - Members of the floor and roof construction not having direct connections to the columns.
  - Bracing members other than those that are a part of the primary structural frame.

67

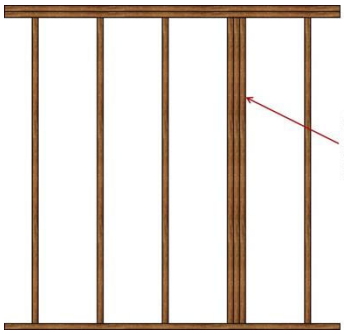
Section 704.4 – Protection of secondary members

- Secondary members also to be protected by individual encasement, with exception for vertical elements in light-frame construction and horizontal assemblies
- Section 704.4 permits horizontal assemblies to be protected with a membrane or ceiling that provides the required fire-resistance rating and is installed per Section 711 (Horizontal Assemblies)

68

Section 704.4.1 – Protection of secondary members – Light Frame Construction

- Columns in light-frame construction are permitted to have required fire-resistance ratings provided by membrane protection where they are:
  - Integral elements in the wall of light-frame construction, and
  - Located entirely between the top and bottom plates or tracks.
- These boundary elements, including both built-up and solid structural elements, are intended to be protected in the same manner as the repetitive use members.



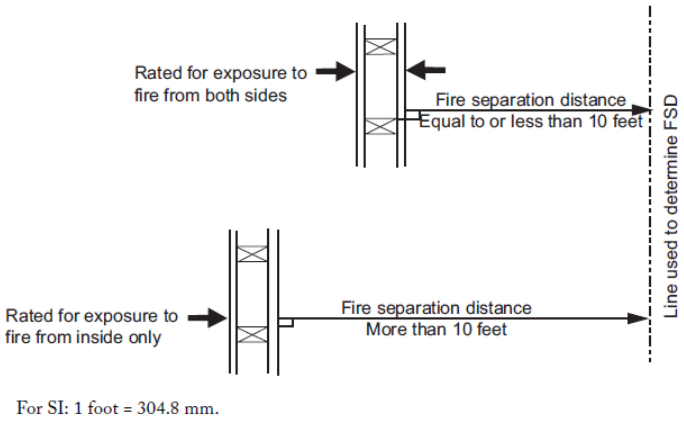
69

Sections 703.2.1, 705.5 – Fire-resistance ratings

- Interior walls to be tested assuming fire exposure from both sides.
- Exterior walls shall be rated for exposure to fire from:
  - Both sides where the separation distance is 10 feet or less.
  - Inside where the fire separation distance exceeds 10 feet.

70

Section 705.5 – Fire-resistance ratings



For SI: 1 foot = 304.8 mm.

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71

Section 703.2.1 – Nonsymmetrical wall construction

- The provisions of Section 703.2.1 reflect the concept that all interior walls are assumed to be subject to an internal fire from either side of the wall.
- Therefore, the wall assembly must be such that it provides the necessary degree of fire resistance from both sides.

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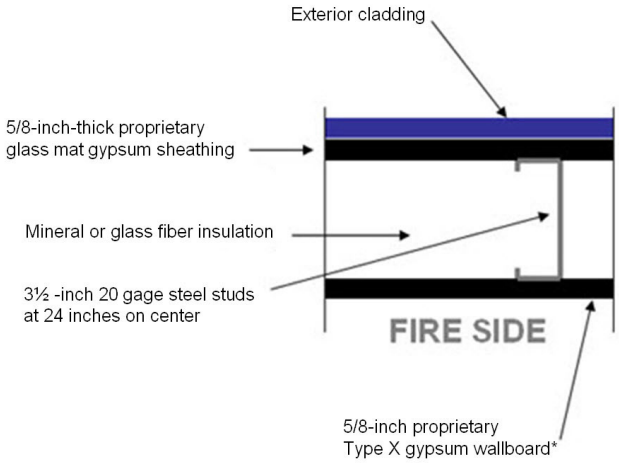
72

Section 703.2.1 – Nonsymmetrical wall construction



For SI: 1 inch = 25.4 mm.

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73

Type of Construction Section 602

- Since the provisions for type of construction primarily address the structural integrity of building elements under fire conditions, nonbearing walls are not regulated for fire resistance due to construction type.
- However, limitations on the use of combustible materials do apply to nonbearing walls and partitions (both interior and exterior).

2018 IBC Types of Construction and Application 74

LEARNING center

74

Type of Construction Section 602.1

- Protection of openings, such as door and window assemblies, ducts and air transfer openings in building elements not required unless mandated by other provisions of IBC.

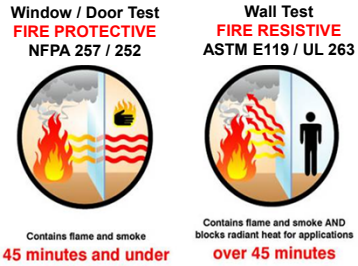
2018 IBC Types of Construction and Application 75

LEARNING center

75

Section 703.6 – Fire-resistance-rated glazing

- Glazing meeting the conditions of ASTM E119
- UL 263 is permitted for use as a fire-resistance-rated wall element provided it complies with the applicable provisions of Chapter 7.



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LEARNING center

76

Type of Construction—Table 601

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	HT	A	B
Primary structural frame[f] (see Section 202)	3[a, b]	2[a, b]	1[b]	0	1[b]	0	HT	1[b]	0
Bearing walls Exterior[e, f] Interior	3 3[a]	2 2[a]	1 1	0 0	2 1	2 0	2 1/HT	1 1	0 0
Nonbearing walls and partitions Exterior	See Table 602								
Nonbearing walls and partitions Interior[d]	0	0	0	0	0	0	See Section 2304.11.2	0	0
Floor construction and associated secondary members (see Section 202)	2	2	1	0	1	0	HT	1	0
Roof construction and associated secondary members (see Section 202)	1 1/2[b]	1[b,c]	1[b,c]	0[c]	1[b,c]	0	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 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 602).
f. Not less than the fire-resistance rating as referenced in Section 704.10.

77

Notes to Table 601
Note a

- In buildings of Type IA and IB construction, the required fire-resistance ratings of structural frame members and interior bearing walls is permitted to be reduced by 1 hour if only supporting a roof.
  - This allowance does not apply to exterior bearing walls.

78

Notes to Table 601
Note b

- For buildings of Type I, IIA, IIIA or VA construction, fire protection of the roof construction, including the primary structural frame members, framing and decking, is not required if every part of the roof is at least 20 feet above the floor below.
- The elimination of the required fire resistance is not permitted in Group F-1, H, M and S-1 occupancies due to the possible extensive fire loading and the potential for such combustible loading to be located close to the roof height.

2018 IBC Types of Construction and Application 79

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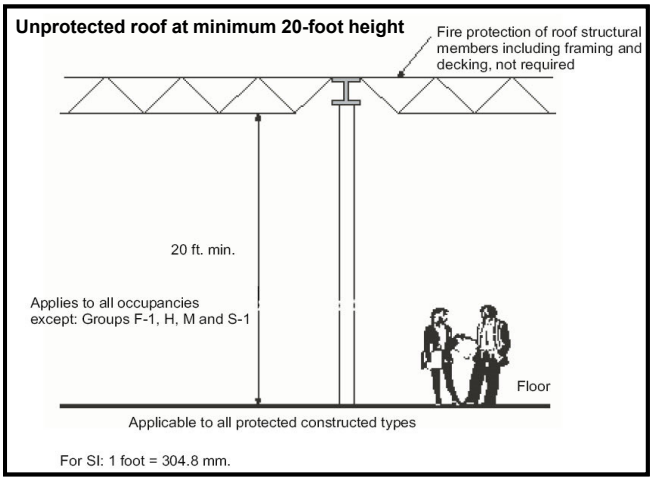
79

Notes to Table 601
Note b

Applicable to Type I, IIA, IIIA and VA construction



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80

Notes to Table 601
Note c

- In all occupancies, the roof is permitted to be of heavy timber construction as specified in:
  - Section 2304.11.1.3 for roof framing.
  - Section 2304.11.4 for roof decks.
- Allowance is applicable in Type IB, IIA, IIB, IIIA and VA.
  - Note that this allowance permits heavy-timber roof on Type IB, IIA, IIIA and VA buildings without any required fire-resistance rating.

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81

Notes to Table 601
Note d

- It must always be remembered that other sections of the IBC may also require the fire resistance of building elements.
- In such instances, the most restrictive provisions shall apply.

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82

Notes to Table 601
Note e

- Exterior bearing walls must be evaluated for fire-resistance-rated protection based on both Table 601 and Table 602.
- The most restrictive requirement will regulate the minimum required rating of the exterior bearing wall.

2018 IBC Types of Construction and Application 83

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83

Notes to Table 601
Note e

- Table 602 also regulates the fire-resistance of exterior walls.
  - Unlike Table 601, provisions apply for both bearing and nonbearing walls.
- Table 602 does not deal with structural integrity of the exterior wall, but rather its resistance to the transfer of radiant heat from one building to another.

2018 IBC Types of Construction and Application 84

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84

Notes to Table 601
Note e

- In lieu of a fire-resistance-rated exterior wall, adequate spatial separation is permitted.
  - Such separation defined as “fire-separation distance”

TABLE 602
FIRE-RESISTANCE RATING REQUIREMENTS FOR EXTERIOR WALLS BASED ON FIRE SEPARATION DISTANCE[a, d, g]

FIRE SEPARATION DISTANCE = X (feet)	TYPE OF CONSTRUCTION	OCCUPANCY GROUP H[e]	OCCUPANCY GROUP F-1, M, S-1[f]	OCCUPANCY GROUP A, B, E, F-2, I, R[i], S-2, U[h]
X < 5[b]	All	3	2	1
5 ≤ X < 10	IA Others	3 2	2 1	1 1
10 ≤ X < 30	IA, IB IIB, VB Others	2 1 1	1 0 1	1[c] 0 1[c]
X ≥ 30	All	0	0	0

2018 IBC Types of Construction and Application 85

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85

Notes to Table 601
Note f

- Where load-bearing structural members are located within the exterior walls or on the outside of a building or structure, the provisions of Section 704.10 shall comply.
- The minimum fire-resistance rating of such structural members is to be based upon the highest rating as determined by:
  - As required by Table 601 for the type of building element
  - As required by Table 601 for exterior walls’
  - As required by Table 602 based on fire separation distance

2018 IBC Types of Construction and Application 86

LEARNING center

86

Notes to Table 601
Note f

Given: An exterior nonbearing wall in a Type IIIB building housing a Group M occupancy. The wall has a fire separation distance of 15 feet to an interior lot line.

Determine: The minimum required fire-resistance rating for structural columns located within the exterior wall.

- Structural Frame Members (Table 601) 0 hour(s)
- Exterior Bearing Walls (Table 601) 2 hour(s)
- Fire Separation Distance (Table 705.5) 1 hour(s)
- Required Column Rating (Highest of 3) 2 hour(s)

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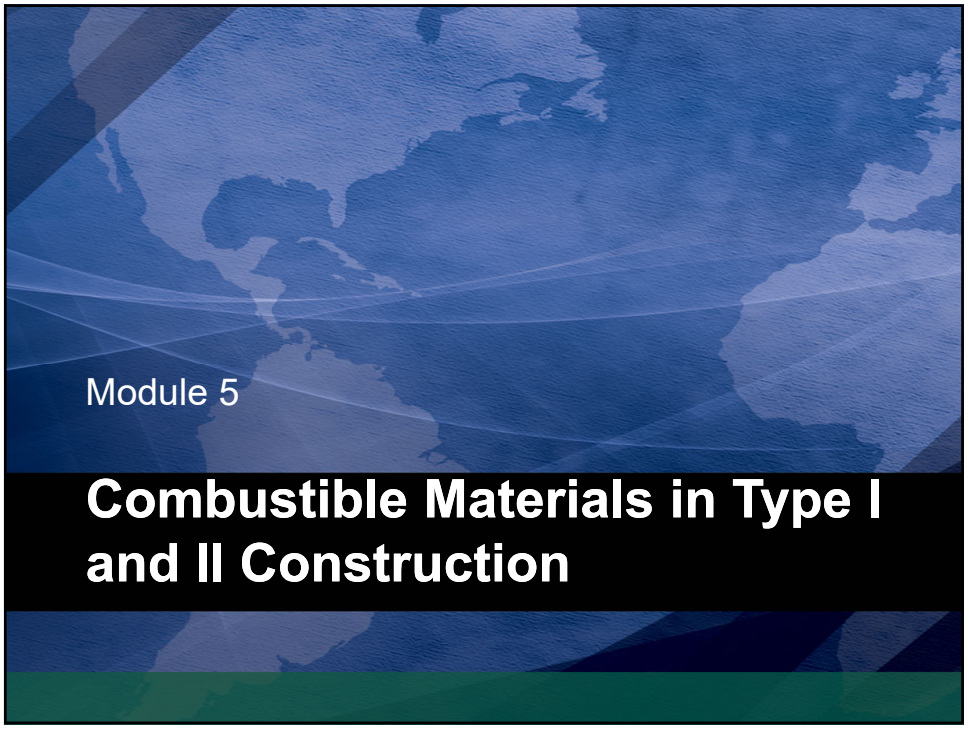
87



88

Combustible Materials in Type I and II Construction Section 603

- 26 applications are listed where combustible materials are permitted in buildings otherwise required to be noncombustible (Type I or II).
- Allowances have been made for small amounts of combustibles that will not effectively increase the fire load.
- In addition, some combustible materials are permitted because there are safeguards in place such that the hazards are effectively mitigated.

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89

Fire-Retardant-Treated Wood Section 603.1, #1

- In buildings of Type I or II construction, fire-retardant-treated (FRT) wood is permitted in:
  - Nonbearing partitions where required rating ≤ 2 hours
  - Nonbearing exterior walls where rating not required
  - Roof construction
    - Not applicable to buildings of IA construction exceeding 2 stories in height unless upper floor to roof height ≥ 20 feet
  - Balconies, porches, decks and exterior stairways where:
    - Not used as required exits, and
    - Building ≤ 3 stories above grade plane

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90

Fire-Retardant-Treated Wood Section 2303.2

- Fire-retardant-treated wood is considered any wood product that:
  - Is impregnated with chemicals by a pressure process or other means during manufacture
  - When tested, has a listed flame spread ≤ 25, and
  - Shows no evidence of significant progressive combustion when tested for additional 20 minutes, and
  - Flame front does not progress more than 10.5 feet beyond the centerline of the burners at any time.

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91

Thermal and Acoustical Insulation Section 603.1, #2

- Combustible thermal and acoustical insulation is permitted in Type I and II buildings, except:
  - Foam plastic insulation is regulated under Item #3
  - Where the flame spread index does not exceed 25
    - A maximum flame spread of 100 is permitted for insulation placed between two layers of noncombustible materials without an intervening air space
    - A maximum flame spread of 200 is permitted for insulation installed between a finished floor and solid decking without intervening air space

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92

Foam Plastics Section 603.1, #3

- Where foam plastic insulation complies with Section 2603, it is permitted in Type I and II buildings.
- Regulations address:
  - Labeling and identification
  - Surface-burning characteristics
  - Thermal barriers
  - Use in exterior walls
  - Roofing
  - Plenums
  - Termite protection
  - Special approval
  - Cladding attachment

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93

Foam Plastics in Exterior Walls Section 2603.5

- Where foam plastic insulation is located within an exterior wall assembly of a Type I, II, III or IV building, the walls shall be regulated for:
  - Fire-resistance rating
  - Thermal barrier*
  - Potential heat*
  - Flame spread index
  - Smoke-developed index
  - Vertical and lateral fire propagation*
  - Labeling
  - Ignition

*Not required for one-story buildings complying with Section 2603.4.1.4

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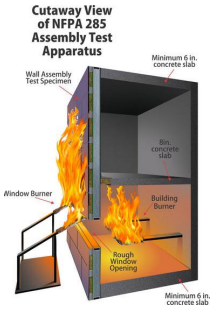
94

Fire Propagation Section 2603.5.5

- Where foam plastic insulation is located within an exterior wall assembly of a Type I, II, III or IV building, the wall assembly shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.
  - Exceptions for complying one-story buildings and those buildings with wall assemblies where the foam plastic insulation is covered on each face by not less than 1-inch thickness of masonry or concrete



95

Roof Coverings Section 603.1, #4

- The roof coverings on Type I and II buildings are permitted to be combustible if classified as Class A, B or C (required in almost all buildings).
- According to Table 1505.1, roof coverings must be classified, except:
  - In all types of construction other than Types IIB, IIIB and VB
  - In Group R-3 and U occupancies with a minimum fire separation distance (FSD) of 6 feet
- In nonrated construction, such as Type IIB, a nonclassified special purpose roof is permitted for small buildings with a minimum FSD of 10 feet.

96

Roof Coverings
Section Table 1505.1

TABLE 1505.1
MINIMUM ROOF COVERING
CLASSIFICATION FOR TYPES OF CONSTRUCTION[a, b]

IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB
B	B	B	C[c]	B	C[c]	B	B	C[c]

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Unless otherwise required in accordance with the *International Wild-land-Urban Interface Code* or due to the location of the building within a fire district in accordance with Appendix D.

b. Nonclassified roof coverings shall be permitted on buildings of Group R-3 and Group U occupancies, where there is a minimum fire-separation distance of 6 feet measured from the leading edge of the roof.

c. Buildings that are not more than two stories above grade plane and having not more than 6,000 square feet of projected roof area and where there is a minimum 10-foot fire-separation distance from the leading edge of the roof to a lot line on all sides of the building, except for street fronts or public ways, shall be permitted to have roofs of No. 1 cedar or redwood shakes and No. 1 shingles constructed in accordance with Section 1505.7.

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97

Roof Coverings
Section 1505

- Class A roof assemblies are effective against severe fire test exposure.
- Class A roof assemblies and coverings include:
  - Assemblies and coverings listed and identified as Class A
  - Brick, masonry or exposed concrete roof deck
  - Ferrous or copper shingles or sheets
  - Metal sheets or shingles
  - Clay or concrete roof tile or slate installed on noncombustible deck
  - Ferrous, copper or metal sheets installed without a roof deck on noncombustible framing

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98

Roof Coverings Section 1505

- Class B roof assemblies are effective against moderate fire test exposure.
  - Class B assemblies and coverings to be listed and identified as Class B.
- Class C roof assemblies are effective against moderate fire test exposure.
  - Class C assemblies and coverings to be listed and identified as Class C.
- Special purpose roofs consist of wood shakes or shingles over an underlayment of Type X gypsum board installed beneath wood sheathing.

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99

Floor Finishes and Coverings Section 603.1, #5

- The interior floor finishes and floor coverings in Type I and II buildings are permitted to be combustible if in accordance with Section 804.
- Section 804 regulates the classification, testing, identification and compliance requirements for floor finishes comprised of fibers.

Minimum classification of floor covering materials in exit enclosures, exit passageways, and corridors

		Class I	Class II	DOC FF-1 "pill test"
Groups I-1, I-2, I-3	Sprinklered		X	
	Nonsprinklered	X		
Groups A, B, E, H, I-4, M, R-1, R-2, S	Sprinklered			X
	Nonsprinklered		X	
Other groups	Sprinklered			X
	Nonsprinklered			X

Classification of floor covering materials

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100

Millwork
Section 603.1, #6

- Combustible millwork is permitted in Type I and II buildings under all conditions.
- Examples include:
  - Doors
  - Door frames
  - Window sashes
  - Window frames

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101

Wall and Ceiling Finishes
Section 603.1, #7

- Combustible interior wall and ceiling finishes are permitted in Type I and II buildings where in compliance with Section 803.
- Section 803 requires all wall and ceiling finish materials be classified for fire performance and smoke development unless specifically exempted.

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102

Wall and Ceiling Finishes Section 603.1, #7

- Purpose is to limit flame spread and smoke development.
  - < 0.036 inches thick applied directly to surface of walls and ceilings not required to be tested (Sec. 803.2)
  - Exposed heavy timber of Type IV construction not regulated for interior finish requirements in other than interior exit stairways and exit passageways (Sec. 803.3)
  - **Combustible materials are acceptable as finish for walls, ceilings, floor and other interior surfaces (Sec. 802.5)**
  - Decorative materials are restricted by combustibility, fire performance and flame propagation performance criteria per Section 806 (Sec. 803.2)
  - The focus is on combustibility and flame resistance in terms of ability to propagate flame

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103

Trim Section 603.1, #8

- Trim defined as picture molds, chair rails, baseboards, handrails, door and window frames, and similar decorative or protective materials used in fixed applications
- Combustible trim limited to 10 percent of the aggregate walls or ceilings
  - Not applicable to handrails and guardrails
- Minimum Class C flame spread index and smoke-developed index when tested to ASTM E84/UL 723
  - Does not apply to foam plastic used as interior trim

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104

Show Windows Section 603.1, #9

- In Type I and II buildings, combustible show windows, nailing and furring strips, and wooden bulkheads below show windows permitted, including their frames, aprons and showcases, provided such elements are installed no more than 15 feet above grade.

2018 IBC Types of Construction and Application 105

LEARNING center

105

Finish Flooring Section 603.1, #10

- Combustible materials are also permitted to installed on, or embedded in, floors of buildings of Type I or II construction.
- Floor sleepers to be noncombustible unless space between floor assembly and flooring is:
  - Solidly filled with noncombustible materials, or
  - Fireblocked per Section 718 with no open spaces under or through permanent partitions or walls
- Wood finished flooring permitted to be attached directly to embedded or fireblocked wood sleepers
- Combustible insulating boards limited to ½-inch thickness

2018 IBC Types of Construction and Application 106

LEARNING center

106

Partitions Dividing Stores and Offices
Section 603.1, #11

- In buildings of Type I or II construction, partitions of stores, offices and similar places are permitted to be constructed of:
  - Fire-retardant-treated wood, or
  - 1-hour fire-resistance-rated construction
  - Maximum 6-foot-high wood panels or similar light construction
- Such partitions cannot be a part of corridor construction where the corridor serves an occupant load of 30 or more

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107

Stages and Platforms
Section 603.1, #12

- In buildings of Type I or II construction, stages and platforms are permitted to be constructed of combustible materials where permitted by Section 410.2 and 410.3, respectively.

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108

Stages
Section 410.2

- In buildings of Type I or II construction, stages are required to be constructed of materials as required for floors based on the building's construction type.
- Stages are permitted to be constructed of combustible materials where:
  - In Type IIB construction, stage floors with a nominal 2-inch wood deck may be of combustible construction.
  - In Type IIA construction, stage floors need not be fire-resistance-rated provided the space below the floor is protected by a fire sprinkler or fire-extinguishing system.
  - Finished floor may be constructed of wood. Openings through floor to be equipped with tight-fitting, solid wood doors with approved safety locks.

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109

Platforms
Section 410.3

- In buildings of Type I or II construction, platforms are required to be constructed of materials as required for building's type of construction.
- Platforms permitted to be constructed of fire-retardant-treated wood where:
  - Not more than 30 inches above main floor, and
  - Not more than 1/3 of room floor area, and
  - No more than 3,000 square feet in area.
- Minimum 1-hour construction required for space beneath platform where used for:
  - Storage, or
  - Any purpose other than equipment, wiring or plumbing.

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110

Temporary Platforms Section 410.3.1

- In buildings of Type I or II construction, platforms installed for a period of not more than 30 days are permitted to be constructed of any materials permitted by code.
  - Space between floor and platform to be used for only plumbing and wiring to platform equipment.

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111

Exterior Elements Section 603.1, #13

- A number of combustible exterior wall elements are permitted by Chapter 14 and Section 705.2.3.1 in buildings of Type I and II construction, including:
  - Water-resistive barriers in exterior walls
  - Exterior wall coverings
  - Metal composite materials (MCMs)
  - Balconies and similar projections

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112

Water-Resistive Barriers in Exterior Walls Section 1402.5

- Exterior walls of Type I, II, III and IV buildings that are greater than 40 feet in height above grade plane and contain a combustible water-resistive barrier to be tested and comply with acceptance criteria of NFPA 285, except:
  - Where a water-resistive barrier is the only combustible component in the exterior wall, and:
    - There is a wall covering of brick, concrete, stone, terra cotta, stucco or steel, or
    - The barrier has complying heat release rates, a flame spread index ≤ 25, a smoke-developed index ≤ 450, and a complying heat release rate.

113

Combustible Materials on the Exterior Side of Exterior Walls Section 1405.1.1

- Section 1405.1.1 permits combustible wall coverings on the exterior side of exterior walls of buildings of Type I, II, III and IV where limited to:
  - 10% of the wall surface where fire separation distance is less than 5 feet, and
  - 40 feet in height above grade plane regardless of fire separation distance
- No limit on surface area and allowed to 60 feet in height where of fire-retardant-treated wood.

114

Combustible Materials on the Exterior Side of Exterior Walls Sections 1405.1.1, 1404.5

- Wood veneers may also be installed on the exterior side of exterior walls of Type I, II, III and IV buildings provided:
  - Veneer is limited in thickness as specified in Section 1404.5
  - Veneer is limited to 40 feet in height above grade
    - 60 feet where FRT wood is used
  - Veneer is attached to, or furred from, a noncombustible backing
  - Where open or space wood veneers (without concealed spaces) are used, they shall project no more than 24 inches.

115

Metal Composite Materials (MCM) Section 1406.10

- Metal composite material is *a factory-manufactured panel consisting of metal skins bonded to both faces of a solid plastic core*.
- In buildings of Types I, II, III and IV construction, MCMs to comply with:
  - Flame spread index of 25 or less, and
  - Smoke-developed index of 450 or less, and
  - Separation from interior of building by an approved thermal barrier consisting of ½" gypsum wallboard
    - Alternate membrane permitted where in compliance with both Temperature Fire Test and Integrity Fire Test of NFPA 275

116

Metal Composite Materials (MCM) Section 1406.10

- Further regulation is established where MCMs are installed more than 40 feet above grade plane on buildings of Type I, II, III or IV construction.
- In addition to the general mandate regulating flame spread, smoke development and thermal barrier protection, such MCM systems are to be tested and comply with acceptance criteria of NFPA 285.
  - Testing to be performed with the MCM in the maximum thickness intended for use.

117

Balconies and Similar Projections Sections 705.2.1, 705.3.1

- Projections from walls of Type I and II construction to be of:
  - Noncombustible materials, or
  - Combustible materials as allowed by Section 705.2.3.1.
- Balconies and similar projections of combustible construction, other than FRT wood, to be:
  - Fire-resistance-rated where required by Table 601 for floor construction, or
  - Heavy timber construction

118

Balconies and Similar Projections Section 705.3.1

- Projections from walls of Type I and II construction to be of:
  - Noncombustible materials, or
  - Combustible materials as allowed by Section 705.2.3.1.
- Balconies and similar projections of combustible construction, other than FRT wood, to be:
  - Fire-resistance-rated where required by Table 601 for floor construction, or
  - Heavy timber construction
- FRT wood allowance per Section 603, #1.4

119

Blocking Section 603.1, #14

- In Type and II buildings, blocking is permitted to be of combustible construction, including where used for:
  - Handrails
  - Millwork
  - Cabinets
  - Window frames
  - Door frames

120

Light-Transmitting Plastics Section 603.1, #15

- Light-transmitting plastics are permitted in buildings of Type I and II construction where in compliance with Chapter 26.
- Regulated plastic elements include:
  - General provisions Section 2606
  - Wall panels Section 2607
  - Plastic glazing Section 2608
  - Roof panels Section 2609
  - Skylight glazing Section 2610
  - Interior signs Section 2611

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121

Mastics and Caulking Materials Section 603.1, #16

- In buildings of Type I and II construction, mastics and caulking materials applied to provide flexible seals between components of exterior wall construction are permitted to be combustible.

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122

Exterior Plastic Veneer Section 603.1, #17

- Where exterior plastic veneer is installed per Section 2605.2 in buildings of Type I or II construction, it is permitted to be of combustible materials.
  - Not permitted for plastic siding
- Exterior plastic veneer to meet following requirements:
  - Compliance with Section 2606.4 addressing:
    - Self-ignition temperature
    - Smoke-developed index, or
    - Maximum smoke density rating
    - Combustibility classifications of CC1 or CC2
  - Maximum attachment height of 50 feet above grade
  - Maximum 300-sf sections separated by at least 4 feet

123

Nailing and Furring Strips Section 603.1, #18

- Combustible nailing strips and furring strips installed in accordance with Section 803.15 are permitted in buildings of Type I and II construction.
  - Interior finishes to be applied directly against noncombustible construction or to furring strips not exceeding 1¾ inches, applied directly to such surfaces
  - If applied to furring strips, the intervening spaces between furring strips to be filled with an inorganic, noncombustible or Class A material, or fireblocked at maximum 8-foot intervals
  - With exceptions, finishes set out more than 1¾ inches shall be minimum Class A

124

Heavy Timber Section 603.1, #19

- Heavy timber members are permitted in buildings of Type I and II construction where in conformance with:
  - Table 601, note c — Roof construction
  - Section 602.4.4.3 — Wood columns and arches
  - 705.2.3.1 — Balconies and similar projections
- Section 602.4.4.3 allows exterior heavy timber structural members where a minimum horizontal separation is provided

125

Aggregates and Admixtures Section 603.1, #20

- Combustible aggregates, component materials and admixtures may be used in Type I and II buildings as permitted by Section 703.2.1.2.
- In fire-resistance-rated construction, combustible aggregates are permitted in gypsum and Portland cement mixtures.
  - Any component material or admixture is permitted in assemblies if the resulting tested assembly meets the fire-resistance testing requirements of the IBC.

126

Fire-Resistant Materials Section 603.1, #21

- Sprayed fire-resistant materials and intumescent and mastic fire-resistant coatings that are combustible are permitted in Type I and II buildings where:
  - Determined on the basis of fire resistance tests in accordance with Section 703.2, and
  - Installed in accordance with special inspections and tests established in Sections 1705.14 and 1705.15

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127

Penetrations Section 603.1, #22

- Combustible materials used to protect penetrations in fire-resistance-rated assemblies are permitted in Type I and II construction where the conditions of Section 714 (Penetrations) are met.

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128

Joints
Section 603.1, #23

- Combustible materials used to protect joints in fire-resistance-rated assemblies are permitted in Type I and II construction where the conditions of Section 715 (Joints and Voids) are met.

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129

Concealed Spaces
Section 603.1, #24

- Combustible materials are permitted in concealed spaces of buildings of Type I and II construction where in accordance with Section 718.5.
- General provision mandates that combustible materials not be permitted in concealed spaces of buildings of Type I or II construction.
  - Six exceptions allow for use of specified combustible materials

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130

Concealed Spaces Section 718.5, Exceptions

- The following combustible materials are permitted in concealed spaces of Type I and II buildings:
  - Materials permitted in accordance with Section 603
  - Materials exposed within plenums complying with Section 602 of the IMC
  - Class A interior finish materials classified per Section 803
  - Piping within partitions or shaft enclosures installed in accordance with IBC
  - Piping within concealed ceiling spaces installed in accordance with IMC and IPC
  - Insulation and covering on pipe and tubing installed in concealed spaces, other than plenums
    - Maximum flame spread index of 25
    - Maximum smoke-developed index of 450

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131

Materials Exposed Within Plenums Section 603.1, #25

- Materials exposed within plenums are permitted to be combustible in Type I and II construction where in accordance with Section 602 of the *International Mechanical Code*.
- General IMC requirement mandates that materials within plenums be noncombustible or be listed and labeled as having:
  - Maximum flame spread index of 25, and
  - Maximum smoke-developed index of 50
- Six exceptions allow for combustible materials

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132

Materials Exposed Within Plenums IMC Section 602.2.1, Exceptions

- Exceptions to Section 602.2.1 include:
  - Rigid and flexible ducts and connectors conforming to IMC Section 603
  - Duct coverings, linings, tape and connectors conforming to IMC Sections 603 and 604
  - Materials exposed in plenums in one- and two-family dwellings
  - Smoke detectors
  - Materials fully enclosed within:
    - Continuous noncombustible raceways or enclosures
    - Approved gypsum board assemblies
    - Plenum where such materials listed and labeled for installation
  - Materials in Group H-5 fabrication areas, including above and below that share a common air recirculation path

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133

Materials Exposed Within Plenums IMC Section 602.2.1, Exceptions

- Additional IMC provisions addressing the use of combustible materials in plenums address:
  - Wiring
  - Fire sprinkler piping
  - Pneumatic tubing
  - Electrical equipment
  - Discrete plumbing and mechanical products
  - Foam plastic as interior finish or trim
  - Plastic plumbing piping and tubing
  - Pipe and duct insulation

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134

Freezer and Cooler Walls Section 603.1, #26

- Combustible materials are permitted to be combustible in freezer walls and cooler wall of Type I and II buildings where:
  - Floor area of freezer/cooler less than 1,000 square feet, and
  - Lined on both sides with noncombustible material, and
  - Building protected throughout with automatic sprinkler system

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135

Ducts, Piping and Electrical Sections 603.1.1 through 603.1.3

- In buildings of Type I and II construction:
  - The use of nonmetallic ducts is permitted where installed in accordance with the limitations of the IMC.
  - The use of combustible piping materials is permitted where installed in accordance with the limitations of IPC and IMC.
  - The use of electrical wiring methods with combustible insulation, tubing, raceways and related components is permitted where installed in accordance with IBC.
    - Section 2701 references NFPA 70 for electrical installations.

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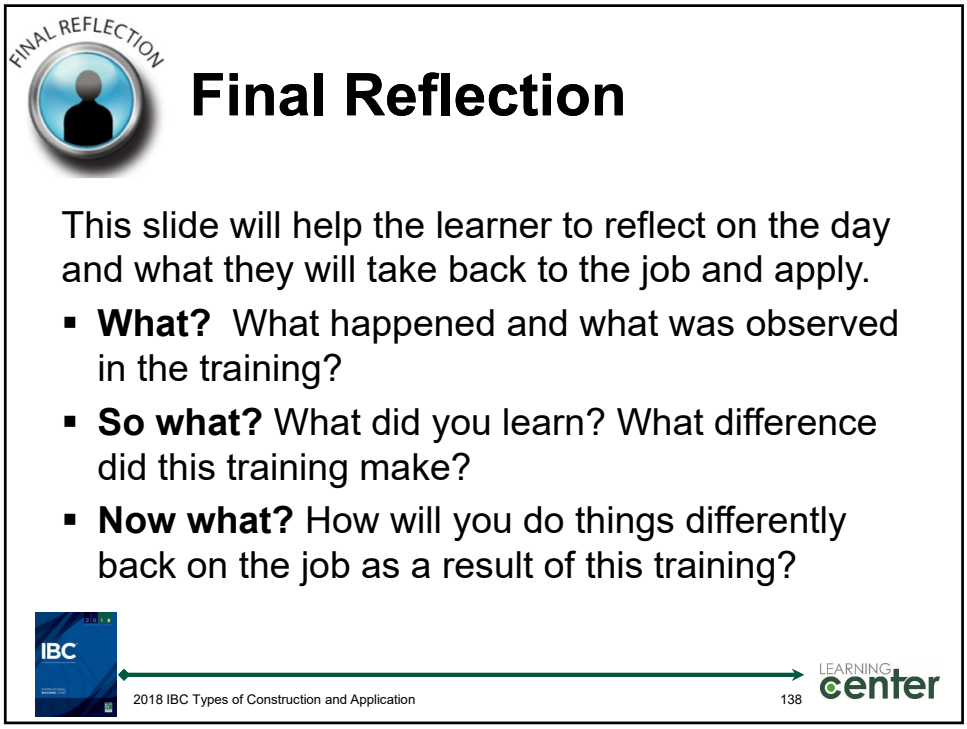
136


Summary/Q&A

137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138
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138

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139

139

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140

140

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141

