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OBJECTIVES

- Identify a number of the differences between 2021 and the 2018 editions of the IBC, IFC and IRC.
- Identify changes in format and technical requirements.
- Explain the intent and application of the changes.

Nick Youngson - link to - http://nyphotographic.com/

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306.2 Group F-1 Occupancy Classification

- Two new items added to listing of Group F-1 occupancies.
- Energy storage systems (ESS) in dedicated-use buildings.
  - Administrative/support areas without ESS permitted where ≤ 10% of floor area of the story where located
  - In mixed-occupancy buildings, ESS to be classified the same as major occupancy
  - Previously would often be classified as Group H-2, however new IFC provisions address potential hazards to allow for a reduction in occupancy classification.
- Water/sewer treatment plants
  - Typically contain materials in use that would warrant a Group H classification should MAQs be exceeded.

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307.1.1 Uses Not Classified as Group H

- Two new items have been added to the list of uses that store, use and/or handle hazardous materials but are not to be classified as Group H.
  - Distilling or brewing of alcohol beverages
  - Storage of beer, distilled spirits and wines in barrels and casks
- Removal of Group H status applicable regardless of alcohol content and quantity of liquid.
- IFC has added additional requirements to address hazards, including automatic sprinkler systems in Group F-1 and S-1 fire areas where such liquids are located.

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414.2.3 Fire Wall Use for Control Areas

- For purposes of determining the number of control areas in a building, each portion separated by one or more fire walls shall be considered a separate building.
  - New allowance permits additional quantities of hazardous materials without classification as a Group H occupancy by increasing the number of control areas permitted in the structure.
- New allowance permits additional quantities of hazardous materials without classification as a Group H occupancy by increasing the number of control areas permitted in the structure.

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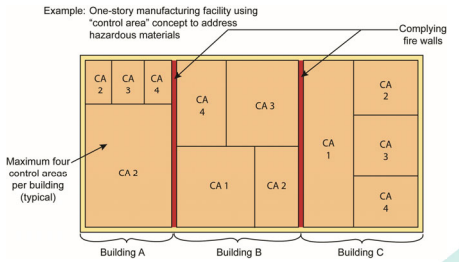
414.2.3 Fire Wall Use for Control Areas



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506.3.2 Allowable Area Frontage Increase

- Methodology for determining allowable area increase for open frontage has been simplified through use of a tabular format.
- Table 506.3.3 based on two criteria:
  - Smallest public way or open space that ≥ 20 feet, and
  - Percentage of building perimeter having ≥ 20 feet of public way and/or open space
- Allowance for weighting the open space area increase has been eliminated
  - Interpolation within Table 506.3.3 is permitted

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506.3.2 Allowable Area Frontage Increase

- Resulting frontage increase intended to be consistent with increase determined by previous method
  - In some cases, greater frontage increases are provided as compared to past methodology

TABLE 506.3.3 Frontage Increase Factor[a]

Percentage of Building Perimeter	Open Space: 0 to less than 20 Feet	20 to less than 25 Feet	25 to less than 30 Feet	30 Feet or greater
0 to less than 25	0	0	0	0
25 to less than 50	0	0.17	0.21	0.25
50 to less than 75	0	0.33	0.42	0.50
75 to 100	0	0.50	0.63	0.75

a. Interpolation is permitted.

- Under certain circumstance, a greater frontage increase may be available to the designer if one or more open spaces not recognized when applying Table 506.3.3 or 506.3.3.1

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506.3.2 Allowable Area Frontage Increase

- EXAMPLE:

Note: If west open space is ignored, I_f would be 0.50 based on 50% of perimeter open with smallest open space of ≥ 30 feet

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510.2 Stairway Construction in Podium Buildings

- Stairway construction in Type IA (lower) portion of podium buildings now permitted to be of combustible materials where two conditions exist:
  - Upper building is of Type III, IV or V construction, and
  - Stairway in lower building enclosed by minimum 3-hour fire-resistance-rated construction (shaft enclosure) with protected openings.
- Addresses confusion on how to address stairway construction that connects combustible and noncombustible portions of a podium building.
  - Section 1011.7 indicates stairways to be built of materials permitted based on building's type of construction.

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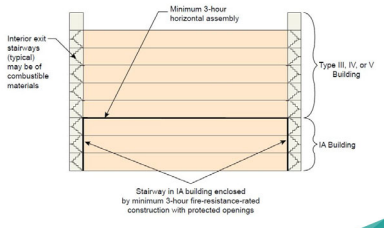
510.2 Stairway Construction in Podium Buildings

- Stairway is conceptually located totally within upper Type III, IV or V building, thus allowing for combustible stairway construction.
  - Minimum 3-hour fire-resistance-rated separation fully separates "combustible" construction from "noncombustible" construction.



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202 Definition of Mass Timber

- Mass timber is considered as structural elements of Type IV construction primarily of solid, built-up, panelized or engineered wood products that meet minimum cross-section dimensions.
- Single term represents both:
  - Heavy-timber designated as Type IV-HT which includes various types of members where fire-resistance is based on minimum dimensions.
  - Mass timber used in new Types IV-A, IV-B and IV-C that must have a fire-resistance rating.

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202 Definition of Mass Timber

- New definition of *noncombustible protection* addresses the passive fire protection required for mass timber.
- Depending on the building's type of construction, mass timber may have a fire-resistance rating obtained:
  - By its own fire-resistive rating, or
  - Through a combination of the inherent mass timber fire-resistance plus protection with noncombustible insulating materials, or
  - Entirely by the noncombustible protection
- The use of noncombustible protection recognizes its value in delaying the combustion of mass timber members.

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Table 504.3 Allowable Height in Feet

- Limits to building height (in feet) have been developed for Types IV-A, IV-B and IV-C construction
- Sprinklered and nonsprinklered options
- Establishment of allowable height started with setting IV-B allowances equivalent to Type IB.
- No unlimited heights for Type IV-A, but typically an increase of 1.5 over Type IV-B.
- Type IV-C generally equivalent to IV-HT limits.
- No additional heights over that permitted for Type IV-HT are permitted for nonsprinklered buildings.

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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	A	B	C	HT	A	B
A, B, E, F, M, S, U	NS[b]	UL	160	65	55	65	55	65	65	65	65	50	40
	S	UL	180	85	75	85	75	270	180	85	85	70	60
H-1, H-2, H-3, H-5	NS[c,d]	UL	160	65	55	65	55	120	90	65	65	50	40
	S												
H-4	NS[c,d]	UL	160	65	55	65	55	65	65	65	65	50	40
	S	UL	180	85	75	85	75	140	100	85	85	70	60
I-1 Condition 1, I-3	NS[d,e]	UL	160	65	55	65	55	65	65	65	65	50	40
	S	UL	180	85	75	85	75	180	120	85	85	70	60
I-1 Condition 2, I-2	NS[d,e,f]	UL	160	65	55	65	55	65	65	65	65	50	40
	S	UL	180	85									
I-4	NS[c,d]	UL	160	65	55	65	55	65	65	65	65	50	40
	S	UL	180	85	75	85	75	180	120	85	85	70	60
R[h]	NS[d]	UL	160	65	55	65	55	65	65	65	65	50	40
	S13D	60	60	60	60	60	60	60	60	60	60	50	40
	S13R	60	60	60	60	60	60	60	60	60	60	60	60
	S	UL	180	85	75	85	75	270	180	85	85	70	60

No changes to footnotes.

Sprinklered: IV-B = I-B & IV-A = 1.5 x IV-B with exceptions

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Table 504.4 Allowable Height in Stories

- Limits to number of stories above grade plane have been established for Types IV-A, IV-B and IV-C construction.
- Rationale for story limits similar to that for height in feet.
- Where building is not sprinklered:
  - Limits on stories same as that allowed for Type IV-HT.
- Consistent with allowable height in feet and allowable floor area, each occupancy reviewed individually to address specific hazards that would warrant a variance from the established process.

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

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION											
		TYPE I		TYPE II		TYPE III		TYPE IV				TYPE V	
		A	B	A	B	A	B	A	B	C	HT	A	B
A-1	NS	UL	5	3	2	3	2	3	3	3	3	2	1
	S	UL	6	4	3	4	3	9	6	4	4	3	2
A-2	NS	UL	11	3	2	3	2	3	3	3	3	2	1
	S	UL	12	4	3	4	3	18	12	6	4	3	2
A-3	NS	UL	11	3	2	3	2	3	3	3	3	2	1
	S	UL	12	4	3	4	3	18	12	6	4	3	2
A-4	NS	UL	11	3	2	3	2	3	3	3	3	2	1
	S	UL	12	4	3	4	3	18	12	6	4	3	2
A-5	NS	UL	UL	UL	UL	UL	UL	1	1	1	UL	UL	UL
	S	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
B	NS	UL	11	5	3	5	3	5	5	5	5	3	2
	S	UL	12	6	4	6	4	18	12	9	6	4	3
S-1	NS	UL	11	4	2	3	2	4	4	4	4	3	1
	S	UL	12	5	34	4	34	10	7	5	5	4	2
S-2	NS	UL	11	5	3	4	3	4	4	4	4-5	4	2
	S	UL	12	6	4	5	4	12	8	5	5-6	5	3

Sprinklered: IV-B = I-B & IV-A = 1.5 x IV-B with exceptions

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Table 506.2 Allowable Building Area

- Limits to building floor areas have been developed for Types IV-A, IV-B and IV-C.
- No unlimited area permitted for any of Type IV classifications.
- Initially, allowable area factors for Type IV-HT construction were increased by following multipliers:
  - Type IV-C: x 1.25
  - Type IV-B: x 2.00
  - Type IV-A: x 3.00
- Factors then re-examined on a case-by-case basis regarding their relative hazard and occupancy classification.

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ALLOWABLE AREA FACTOR (A_t = NS, S1, S13R, S13D OR SM, as applicable) IN SQUARE FEET[a,b]

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION												
		TYPE I		TYPE II		TYPE III		TYPE IV				TYPE V		
		A	B	A	B	A	B	A 3xHT	B 2xHT	C 1.25xHT	HT	A	B
I-1	NS[f,g]	UL	55,000	19,000	10,000	16,500	10,000	54,000	36,000	18,000	18,000	10,500	4,500
	S1	UL	220,000	76,000	40,000	66,000	40,000	216,000	144,000	72,000	72,000	42,000	18,000
	SM	UL	165,000	57,000	30,000	49,500	30,000	162,000	108,000	54,000	54,000	31,500	13,500
I-2	NS[f,i]	UL	UL	15,000	11,000	12,000	NP	36,000	24,000	12,000	12,000	9,500	NP
	S1	UL	UL	60,000	44,000	48,000	NP	144,000	96,000	48,000	48,000	38,000	NP
	SM	UL	UL	45,000	33,000	36,000	NP	108,000	72,000	36,000	36,000	28,500	NP
I-3	NS[f,e]	UL	UL	15,000	10,000	10,500	7,500	36,000	24,000	12,000	12,000	7,500	5,000
	S1	UL	UL	60,000	40,000	42,000	30,000	144,000	96,000	48,000	48,000	30,000	20,000
	SM	UL	UL	45,000	30,000	31,500	22,500	108,000	72,000	36,000	36,000	22,500	15,000
I-4	NS[f,g]	UL	60,500	26,500	13,000	23,500	13,000	76,500	51,000	25,500	25,500	18,500	9,000
	S1	UL	121,000	106,000	52,000	94,000	52,000	306,000	204,000	102,000	102,000	74,000	36,000
	SM	UL	181,500	79,500	39,000	70,500	39,000	229,500	153,000	76,500	76,500	55,500	27,000
M	NS	UL	UL	21,500	12,500	18,500	12,500	61,500	41,000	25,625	20,500	14,000	9,000
	S1	UL	UL	86,000	50,000	74,000	50,000	246,000	164,000	102,500	82,000	56,000	36,000
	SM	UL	UL	64,500	37,500	55,500	37,500	184,500	123,000	76,875	61,500	42,000	27,000

General approach with exceptions.

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Table 601 Type IV Fire-Resistance

- Table 601 identifying minimum fire-resistance rating for building elements based on type of construction has been expanded to include new Type IV-A, IV-B and IV-C buildings.
- General comparison with Type IA (IV-A) and Type IB (IV-B and IV-C).
- Also clarifies that heavy timber roof construction, including primary structural frame members, permitted in: Type IB, IIA, IIB, IIIA and VA buildings.
  - Allows for nonrated combustible roof construction

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TABLE 601 Fire-Resistance Rating Requirements for Building Elements (Hours)

Building Element	Type I A	Type I B	Type II A	Type II B	Type III A	Type III B	Type IV A	Type IV B	Type IV C	Type IV HT	Type V A	Type V B
Primary structural frame[f]	3[a,b]	2[a,b,g]	1[b,g]	0[g]	1[b,g]	0	3[a]	2[a]	2[a]	HT	1[b,g]	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 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

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.

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.

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602.4 Mass Timber Type IV Buildings

- Type IV-A, IV-B and IV-C buildings may be constructed of mass timber and noncombustible materials.
- Required fire-resistance ratings may come from mass timber, noncombustible protection, or both.
  - Protective material to be applied directly to the timber members
  - Assigned time determined per Sections 703.2 and 722.7
- For Type IV-HT construction, minimum timber member dimensions of Section 2304.11 continue to be applicable.

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602.4 Mass Timber Type IV Buildings

- Limited changes to existing heavy timber provisions now designated as Type IV-HT.
- Combustible concealed spaces permitted in all Type IV categories where in conformance with Sections 602.4.1 through 602.4.4.
- Publication "*Mass Timber Buildings and the IBC*" by ICC and AWC addresses Type IV construction in detail.

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602.4.1- 602.4.3 Type IV-A, IV-B and IV-C Buildings

- Type IV-A construction mandates that faces of all timber members be protected with noncombustible materials.
  - Noncombustible wall and ceiling protection to contribute a time per Table 722.7.1(1), but not less than 80 minutes.
  - Floor assembly to be protected with noncombustible material at least 1 inch thick on top.
- Type IV-B construction mandates similar protection, but only required on an established percentage of members.
  - Some degree of exposed timber permitted
- Type IV-C construction permits all timber members to be unprotected.

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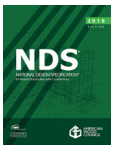
722.1 Fire-Resistance Rating of Exposed Mass Timber Members

- The fire-resistance rating of mass timber members is to be in conformance with Chapter 16 of the *National Design Specification for Wood Construction* (NDS).
- NDS 16.2 addresses fire design up to 2 hours
- Applicable to beams, columns, walls, floors/roofs
- Applicable products include:
  - Sawn lumber
  - Glulam (softwood)
  - LVL
  - PSL
  - LSL
  - CLT



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722.1 Fire-Resistance Rating of Exposed Mass Timber Members

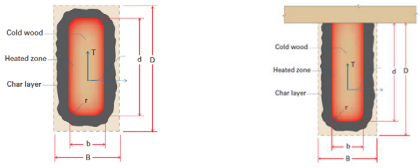

Table 16.2.1A Char Depth and Effective Char Depth (for β_n = 1.5 in./hr.)

Required Fire Resistance (hr.)	Char Depth, a_{char} (in.)	Effective Char Depth, a_{eff} (in.)
1-Hour	1.5	1.8
1½-Hour	2.1	2.5
2-Hour	2.6	3.2

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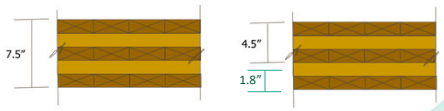
722.7 Fire-Resistance Rating of Mass Timber

Example of determination of effective CLT roof cross-section:

- Assume 5-layers @ 1.5" (total = 7.5")
- Determine thickness for 1-hr FRR
- a_{char} = 1.8" (NDS Table 16.2.1B)
- d = 7.5" – 1.8" = 5.7"
- Will typically assume 3-layer panel for design capacity
  - Layer second from bottom ineffective in one-way panels



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722.7 Fire-Resistance Rating of Mass Timber Assemblies

- A prescriptive approach has been provided to achieve the required fire-resistance ratings for mass timber members and assemblies.
- The fire-resistant rating to consist of the rating of the unprotected mass timber element added to the protection time of the noncombustible protection.
  - At least 2/3 of the required fire-resistance rating must come from the noncombustible protection.
- Provisions address protection on both exterior and interior surfaces.
- The fire-resistance rating of exposed mass timber members is to be in conformance with Chapter 16 of the *National Design Specification for Wood Construction* (NDS).

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TABLE 722.7.1(1) Protection Required from Noncombustible Covering Material

Required Fire-Resistance Rating of Building Element per Tables 601 and 703.5 (hours)	Minimum Protection Required from Noncombustible Protection (minutes)
1	40
2	80
3 or more	120

TABLE 722.7.1(2) Protection Provided by Noncombustible Covering MateriaL

Noncombustible Protection	Protection Contribution (minutes)
1/2-inch Type X gypsum board	25
5/8-inch Type X gypsum board	40

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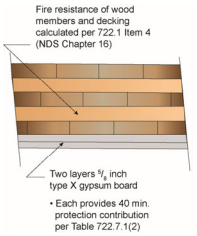
722.7 Fire-Resistance Rating of Mass Timber Assemblies

- Example:



CLT time = 50 minutes
5/8" Type X = 40 minutes
5/8" Type X = 40 minutes

Total 130 minutes

(acceptable for 2-hour rating)

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1705.5.3 Mass Timber Special Inspection – Construction

- Applicable only to Type IV-A, IV-B and IV-C construction, special inspection requirements have been added to address the anchorage and connection of mass timber structural elements.
- Inspections are similar to requirements for other prefabricated systems, such as precast concrete and structural steel.
- Additional special inspections may be required by the building official for any work unusual in its nature.

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TABLE 1705.5.3 Required Special Inspections of Mass Timber Construction

Type	Continuous Special Inspection	Periodic Special Inspection
1. Inspection of anchorage and connections of mass timber construction to timber deep foundation systems.		X
2. Inspect erection of mass timber construction.		X
3. Inspection of connections where installation methods are required to meet design loads.		
Threaded fasteners.		
Verify use of proper installation equipment.		X
Verify use of pre-drilled holes where required.		X
Inspect screws, including diameter, length, head type, spacing, installation angle, and depth.		X
Adhesive anchors installed in horizontal or upwardly inclined orientation to resist sustained tension loads.	X	
Adhesive anchors not defined in the preceding cell.		X
Bolted connections.		X
Concealed connections.		X

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Table 705.5 Exterior Wall Ratings

- Previous Table 602 addressing "Fire-resistance Rating Requirements for Exterior Walls Based on Fire Separation Distance" has been relocated.
- Relocation is deemed appropriate as Chapter 7 is the primary location for establishing exterior wall requirements related to fire-resistance.
- In addition, entries have been made for new construction types IV-A, IV-B and IV-C.

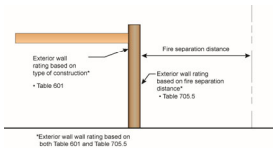

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TABLE ~~602~~ 705.5 Fire-Resistance Rating Requirements for Exterior Walls Based on Fire Separation Distance[a,d,g]

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, IV-A Others	3 2	2 1	1 1
10 ≤ X < 30	IA, IB, IV-A, IV-B IIB, VB Others	2 1 1	1 0 1	1[c] 0 1[c]
X ≥ 30	All	0	0	0

For SI: 1 foot = 304.8 mm.

(footnotes not shown)

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713.12 Top of Shaft Enclosure

- Three specific methods for terminating a shaft enclosure at the top have been established to clarify the options that are available:
  - Extend the shaft walls to the underside of the roof sheathing, deck or slab, or
  - Terminate below the roof assembly with a top enclosure having the same fire-resistance rating as the topmost floor penetrated by the shaft but not less that the required rating of the shaft enclosure, or
  - Extend past the roof assembly and comply with the provisions for rooftop structures (penthouses) in Section 1511.

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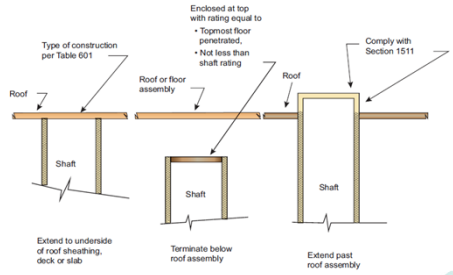
713.12 Top of Shaft Enclosure



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1102 Accessible Design Compliance

- The ICC A117.1 standard as referenced by the IBC for the design and construction of accessible buildings and facilities has been updated from the 2009 edition to the 2017 edition.
- Many of the major revisions are addressed in the ICC publication *Significant Changes to the ICC A117.1 Accessibility Standard*, 2017 Edition, including:
  - Enhanced dimensions for clear floor spaces and turning spaces.
  - Modifications to exterior routes, curb cuts, blended transitions, detectable warnings, passenger drop-offs and parking facilities.

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1105.1.1 Automatic Doors at Public Entrances

- In specified occupancies with sizable occupant loads, the accessible public entrances must now be provided with an automatic door.
  - Where an automatic door is required by Table 1105.1.1, it shall be either a full power-operated door or a low-energy power-operated door.

TABLE 1105.1.1 Public Entrance with Power-Operated Door[a]

Occupancy	Building Occupant Load Greater Than
A-1, A-2, A-3, A-4	300
B, M, R-1	500

a. In mixed-use facilities where the total sum of the building occupant load is greater than those listed, the most restrictive building occupant load shall apply.

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1105.1.1 Automatic Doors at Public Entrances

- In mixed-occupancy buildings where total building occupant load exceeds that listed, the most restrictive building occupant load shall apply, for example:
  - Where Group B has OL of 300 and Group A-3 has OL of 100, total OL of 400, automatic door required based on Group A-3 tabular threshold.
  - Where Group B has OL of 450 and Group E has OL of 60, total OL of 510, automatic door required based on Group B tabular threshold.
- Where the public entrance includes a vestibule, at least one door into and one door out of the vestibule must comply with the requirements.

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1108.5, 1110.2 Assisted Toileting and Bathing

- Changes have been made to the provisions for nursing homes and assisted living facilities to allow some units to have toilet and bathing facilities designed for assisted use.
  - These allowances are permitted instead of the independent use facilities generally intended by the ICC A117.1 Accessible unit provisions.
- Both scoping and technical provisions are provided in IBC.
- The assisted use provisions are optional and can be applied when desired by the designer.
  - Units may be modified for toileting, bathing or both

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1108.5, 1110.2 Assisted Toileting and Bathing

- Assisted water closets and roll-in-type showers may replace like fixtures in up to **50**% of Accessible units in the following occupancies:
  - Group I-1, Conditions 1 and 2
  - Group I-2 rehabilitation facilities
- Assisted water closets and roll-in-type showers may replace like fixtures in up to **90%** of Accessible units in the following occupancies:
  - Group I-2 nursing homes

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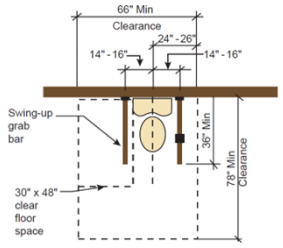
1108.5, 1110.2 Assisted Toileting



- Primary technical changes include:
  - Increased clearance around water closet of 66" with clearance of 24" to 26" from centerline of fixture
  - Increased clearance depth of 78" to allow for additional approach options
  - Allowance for swing-up grab bars that are typically only permitted in Type B units
  - Toilet paper dispenser to be installed on at least one of the swing-up grab bars

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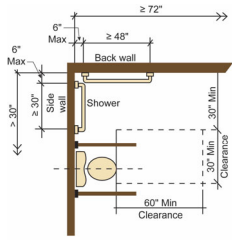
1108.5, 1110.2 Assisted Bathing



Assisted bathing roll-in shower-using exceptions

- Primary technical change is elimination of required folding seat
- Allows for use of rolling chair when necessary
- Sidewall and backwall grab bars now differ, with side-wall bar required on 'seat wall' and both grab bars starting in corners

44

1207 Enhanced Classroom Acoustics

- In Group E occupancies, enhanced classroom acoustics shall be provided in all classrooms having a volume of 20,000 cubic feet or less.
- Intended to apply to standard-sized self-contained classrooms, but not larger spaces for activities such as band or choir.
  - Also not intended to apply to ancillary spaces, such as individual tutoring rooms, corridors, or a cafeteria.
- Good acoustics are essential to support language acquisitions and learning for all children.
- Assistive technologies typically only amplify the teacher and do not amplify discussions between students or between teacher and individual student.

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1207 Enhanced Classroom Acoustics

- Such acoustics to be in compliance with Section 808 of ICC A117.1, including regulation of:
  - Reverberation times based on either the performance method or prescriptive method
  - Ambient sound levels from sources both inside and outside of the classroom
- In addressing reverberation times, both performance and prescriptive methods are available.
- Ambient sound levels not to exceed 35 dBA and 55 dBC

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1406.10 Metal Composite Material (MCM) Cladding

- Metal composite materials (MCM) and systems installed on buildings of Type I, II, III and IV construction are now regulated based upon one of two conditions:
  - Such installations that are over 40 feet above grade plane must comply with:
    - Surface-burning characteristics
      - Flame spread index ≤ 25
      - Smoke developed index ≤ 450
    - Thermal barrier separation
      - Minimum ½" gypsum board or test per NFPA 275
    - Acceptance criteria of NFPA 285
      - Addresses exterior nonload-bearing wall assemblies containing combustible components
  - Such installations that do not exceed 40 feet above grade plane need only comply with surface-burning characteristics and thermal barrier separation.

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1406.10 Metal Composite Material (MCM) Cladding

- Previously, all MCM cladding on buildings of other than Type V to meet all three conditions, or meet alternative conditions of Section 1406.11
- Allowance for use of alternative conditions has been deleted, thus removing issues addressing:
  - Fire separation distance
  - MCM surface area limitation and separation
  - Sprinkler protection throughout building
- Modification addresses any confusion in the various requirements, as well as eliminating allowances previously provided where building is sprinklered.

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1504.9 Aggregate-surfaced Roof

- Minimum parapet heights have been established for aggregate-surfaced roofs to prevent blow-off.
- New Table 1504.9 now mandates minimum heights based on:
  - Aggregate size
  - Mean roof height
  - Wind exposure
  - Basic design wind speed
- Provides engineering and scientific basis for roof design to prevent blow-off based on wind tunnel tests and subsequent field studies of hurricane damage.

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1504.9 Aggregate-surfaced Roof

- Past provisions were not based on a quantitative analysis of observed roofing system performances on real wind events, but rather variations in surface pressure with building height
- Table 1504.8 previously either permitted or prohibited aggregate used as surfacing for roof coverings or ballast solely based on:
  - Maximum mean roof height
  - Design wind load
  - Exposure category
- Conditions where no parapets are provided are no longer allowed

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TABLE 1504.9 Minimum Required Parapet Height (inches) for Aggregate Surfaced Roofs[a,b,c]

Aggregate Size	Mean Roof Height (ft)	Wind Exposure and Basic Design Wind Speed (mph)															
		Exposure B									Exposure C[d]						
		≤95	100	105	110	115	120	130	140	150	≤95	100	105	110	115	120	130	140	150
ASTM D1863 [No.7 or No.67]	15	2	2	2	2	12	12	16	20	24	2	13	15	18	20	23	27	32	37
	20	2	2	2	2	12	14	18	22	26	12	15	17	19	22	24	29	34	39
	30	2	2	2	13	15	17	21	25	30	14	17	19	22	24	27	32	37	42
	50	12	12	14	16	18	21	25	30	35	17	19	22	25	28	30	36	41	47
	100	14	16	19	21	24	27	32	37	42	21	24	26	29	32	35	41	47	53
	150	17	19	22	25	27	30	36	41	46	23	26	29	32	35	38	44	50	56
ASTM D1863 [No.6]	15	2	2	2	2	12	12	12	15	18	2	2	2	13	15	17	22	26	30
	20	2	2	2	2	12	12	13	17	21	2	2	12	15	17	19	23	28	32
	30	2	2	2	2	12	12	16	20	24	2	12	14	17	19	21	26	31	35
	50	12	12	12	12	14	16	20	24	28	12	15	17	19	22	24	29	34	39
	100	12	12	14	16	19	21	26	30	35	16	18	21	24	26	29	34	39	45
	150	12	14	17	19	22	24	29	34	39	18	21	23	26	29	32	37	43	48

For SI: 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

a. Interpolation shall be permitted for mean roof height and parapet height.

b. Basic design wind speed, V, and wind exposure shall be determined in accordance with Section 1609.

c. Where the minimum required parapet height is indicated to be 2 inches (51 mm), a gravel stop shall be permitted and shall extend not less than 2 inches (51 mm) from the roof surface and not less than the height of the aggregate.

d. For Exposure D, add 8 inches (203 mm) to the parapet height required for Exposure C and the parapet height shall not be less than 12 inches (305 mm).

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1704.6 Structural Observations

- Two new classes of structures are now required to be provided with structural observation:
  - Structures classified as Risk Category III (previously limited only to RC IV structures), and
  - Structures in SDC E that are more than two stories above grade plane (no previous requirement based upon SDC)
- Recognizes substantial hazards that may be present in facilities considered as RC III structures, as well as those structural hazards involving multi-story structures in SDC E.

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1705.18 Firestop Inspection in Group R Occupancies

- In Group R fire areas with an occupant load > 250, special inspection is now required for the installation of:
  - Firestops
  - Fire-resistant joint systems
  - Perimeter fire containment systems
- Provides greater assurance that such fire protective features are properly installed where large residential occupant loads are anticipated.

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Questions?

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2021 International Fire Code

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320 Additive Manufacturing

- Additive manufacturing is a process of joining materials to make objects from 3D model data, usually layer upon layer
- Two types of additive manufacturing:
  - Industrial additive manufacturing
  - Non-industrial additive manufacturing

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320 Additive Manufacturing

- *Industrial* additive manufacturing utilizes combustible powders or metals, an inert gas supply, a combustible dust collection system, or creates a hazardous (classified) location area or zone outside of the equipment
- *Industrial* additive manufacturing requirements:
  - Operational permit
  - Listed to UL 2011
  - Use of inert gases must comply with Ch 53
  - FCO can require technical assistance and require an evaluation report
  - Only allowed in manufacturing facilities
  - If the quantities of hazardous materials exceed the maximum allowable quantity per control area, the room or building will become a Group H

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320 Additive Manufacturing

- *Non-industrial* additive manufacturing
  - 3D printing operations that do ***not*** create a hazardous (classified) location area outside of the equipment, and do ***not*** utilize an inert gas supply or a combustible dust collection system
- Must be listed

- Self-contained unit
- ≤30 L of production material
- Cannot use inert gas or combustible dust

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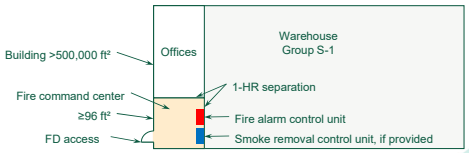
508 Fire Command Center

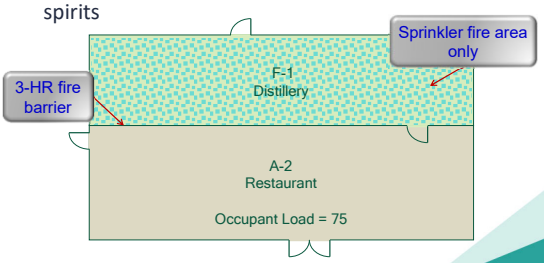
- Fire command center now required in Group F-1 and S-1 where the building footprint > 500,000 sf
- Fire command center must be a minimum of 96 sf with the smallest dimension of 8'



59

903.2.4.2 Distilled Spirits

- Sprinkler system is required throughout the fire area of Group F-1 used for manufacture of distilled spirits



60

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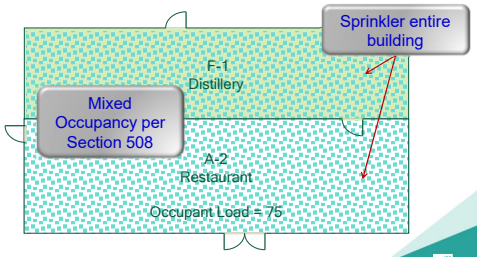

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903.2.9.3 Distilled Spirits

- Sprinkler system is required throughout the fire area of Group S-1 used for bulk storage of distilled spirits or wine

Wine storage with alcohol content of ≤ 16% would be classified as Group S-2

62

903.2.10 Group S-2 Parking Garage

- Open parking garages now have threshold for the installation of a sprinkler system
  - Open parking garage with a fire area > 48,000 sf

63

903.3.1.2 NFPA 13R Sprinkler Systems

- NFPA 13R sprinkler design allowed ***IF***

- 4 stories above grade plane
- No longer count floors above pedestal
- Floor level ≤30' above LLFDVA
- Floor level ≤30' below LLFDVA

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907.2.10 Public-storage and Self-storage Facilities

- Manual fire alarm system required in Group S public- and self-storage facilities ≥ 3 stories
- Coverage of interior corridors and interior common areas

- Only 1 manual fire alarm box required ***IF*** building is sprinklered
- Visible notification ***not*** required in storage units

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907.5.2.1.2 Audible Alarm Sound Pressure

- The threshold for elimination of audible notification appliances has increased from 95 dBA to 105 dBA
- Where the ambient noise level >105 dBA, audible devices are not required

66

907.5.2.1.3 Low-frequency Alarms

- Sleeping rooms in Group R-1 and R-2 shall be provided with a notification signal with a 520 Hz low-frequency signal
- This alarm signal frequency is more effective in waking children and adults over 65 or alcohol impaired

Low-frequency signals can be provided by the alarm itself, or by mounting the alarm on a sounder base

Photo courtesy of Daniel P. Finnegan, Siemens Industry, Inc.

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907.5.2.3.3.1 Expansion Capability in Group R-2 Occupancies

- Fire alarm systems in Group R-2 shall be designed for future visible notification by one of the following:
  - Replacement of audible appliances with audible/visible appliances, or
  - Extension of existing wiring from the unit smoke alarm locations to visible appliances, or
  - Fire alarm power supply and circuits shall provide ≥ 5% excess capacity with a single access point to such circuits shall be available on every story

68

1008.2.1 Stairway Illumination

- Exit stairways, exit access stairways and their associated landings must now have an illumination level under normal power of at least 10 footcandles.
  - Measured at the walking surface
  - Not applicable to stairs in exit discharge
  - Required only when stairway is in use, allowing for occupant-sensor or daylight-responsive controls
  - Exceptions for auditoriums, theaters and similar assembly occupancies still applicable
- Considered as an easily accomplished means for improving stairway safety

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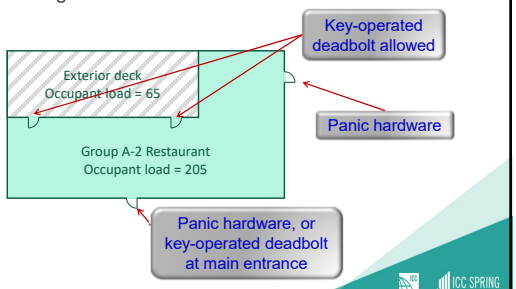
1010.2.4 Locks and Latches

- Except in egress courts, where the egress path travels back into the building, key-operated deadbolts are allowed to be used as the locking device



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1010.2.4 Locks and Latches

- Occupant load ≤300 and sign posted
- Weatherproof telephone or 2-way communication system adjacent 1 door on the exterior side
- Locking device is readily distinguishable as locked
- Locking device shall be key-operated
- Clear window or glazed door opening, ≥5 ft² at each exit access
- Sign on the interior side at each locked: THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED

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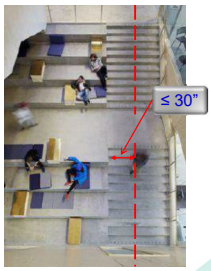
1030.16 Handrails at Social Stairs

- Where seating occurs on one side of stairs and stairs are < 74" wide, only 1 handrail is required
- Where seating occurs on one side of stairs and stairs are ≥ 74" wide, 2 handrails are required
  - Handrail must be ≤ 30" of the tiered floor



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1030.16 Handrails at Social Stairs

- Handrail on the seating side shall be discontinuous
- Where seating is on both sides of stairs, mid-aisle handrail shall be discontinuous

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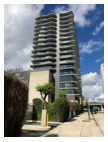
1103.5.4 Sprinklers in High-rise

- Sprinklers required in existing high-rise ***IF*** any of the following exist:
  - Occupied floor > 75' and ≤ 120' and building does not have ≥ 2 interior exit stairs complying with Section 1104.10 with 2-hour enclosure

Section 1104.10
- Tread rise ≤ 8¼"
- Tread run ≥ 9"



This section only applies ***IF*** Appendix M is ***NOT*** adopted

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1103.5.4 Sprinklers in High-rise

- Sprinklers required in existing high-rise ***IF*** any of the following exist:
  - Occupied floor > 75' and ≤ 120' and building does not have a fire alarm system with smoke detection in:
    - Electrical, mechanical, transformer, telephone rooms
    - Corridors
    - Elevator lobbies
    - Doors penetrating interior exit stairway enclosures

This section only applies ***IF*** Appendix M is ***NOT*** adopted

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1103.5.4 Sprinklers in High-rise

- Sprinklers required in existing high-rise ***IF*** any of the following exist:
  - Occupied floor >120' above LLFDVA

Where any of the 3 conditions exist, the owner must:
- File a compliance schedule within 1 year of notification
- Complete the sprinkler installation within 12 years

This section only applies ***IF*** Appendix M is ***NOT*** adopted

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1103.7.5.1 Fire Alarm in Group R-1 Hotel/Motel

- Manual fire alarm system required in existing R-1 hotel or motel when >1 story or >20 sleeping rooms, except:
  1. Fire alarm system not required if only 1-story with >20 sleeping rooms ***AND*** each room has direct access to public way ***AND*** each sleeping room is separated by 1-HR
  2. Fire alarm system not required if ≤3 stories with ≤20 sleeping rooms ***AND*** is sprinklered with NFPA 13 or 13R
  3. Fire alarm system is required but only 1 manual fire alarm box ***IF*** sprinklered with NFPA 13 or 13R

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1103.9 CO Detection in Existing Buildings

- CO detection required in existing:
  - Group I-1, I-2, I-4
  - Group R
  - Classrooms in Group E
- Can be battery operated CO alarms if the code in effect at the time of construction did not require CO detection
- Can be CO alarms or CO detection system

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1203.1.2 Fuel Piping Protection

- Fuel piping for emergency and standby generators requires fire-resistance-rated protection
  - 2-HR listed pipe-protection system – UL 1489
    - Reduced to 1-HR if sprinklered with NFPA 13
  - An assembly provided 2-HR fire-resistance rating
    - Reduced to 1-HR if sprinklered with NFPA 13
  - Other approved methods

Photo courtesy of 3M

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1204 Portable Generators

- Portable generators manufactured after 1/1/2021 must be listed to UL 2201
- Must be grounded
- Portable generators operated:
  - Only outdoors or enclosed areas
  - ≥ 5' from building openings or air intakes
  - Separation from tents per Chapter 31
- Temporary wiring shall be provided with GFCI

Grounding rod

Do not refuel while the generator is operating

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1204 Portable Generators

- Connections to premise wiring system shall ***NOT*** be provided by back-feeding through receptacles
- Connection to a premise served by commercial power must be through a transfer switch
- Connections to buildings not served by commercial power shall comply with NFPA 70

If no transfer switch is available, then the use of relocatable power taps and extension cords to power appliances must comply with §603

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1207 Electrical Energy Storage Systems

- Entire content of Sesction 1207 has been revised
  - Nickel metal hydride technology now included
  - "Other battery technologies" is listed along with "other electrochemical ESS technologies"
  - Sodium batteries are no longer listed separately
    - Included under "Other electrochemical ESS technologies" and are regulated at 3 kWh
  - Capacitor ESS systems included
    - Regulated at ≥3 kWh

Photo provided by Getty Images with permission

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2404.3.3.6 Size of Spray Booths

- Individual spray booths are no longer limited to 1,500 sf
- Limited to the smaller of:
  - 10% of the floor area of the building
  - Basic allowable area for Group H-2
- When only a single booth, it can be 500 sf
  - Even when it exceeds 10%

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2404.3.3.6 Size of Spray Booths

- IBC Table 506.2

Basic allowable area

Occupancy Classification	See Footnotes	TYPE I		TYPE II	
		A	B	A	B
F-1	NS	UL	UL	25,000	15,500
	S1	UL	UL	100,000	62,000
	SM	UL	UL	75,000	46,500

EXAMPLE

Group F-1
Type IIB construction
1-story
Sprinklered
50,000 sf

10% of floor area → Spray Booth 5,000 sf

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Table 3203.8 Lithium-ion Batteries

- Listed as high-hazard commodity
- Can be classified as high-piled storage > 6'

Product Category	Product	Classification
Batteries	Dry cells (excludes lithium, lithium-ion and other similar exotic metals or combustible electrolyte); without blister packing (if blister packed, refer to the commodity classification definitions)	Class I
	Dry cells (nonlithium or similar exotic metals); in blister packing; cartoned	Class II
	Vehicle; any size (for example, automobile or truck); empty plastic casing	High-hazard (Group A unexpanded)
	Vehicle; large (in other words, truck or larger); dry or wet cells (excludes lithium-ion and other cells containing combustible electrolytes)	High-hazard (Group A unexpanded)
	Vehicle; small (for example, automobile); wet cells (excludes lithium-ion and other cells containing combustible electrolytes)	Class I
	Lithium-ion	High-hazard

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3209.4 Automatic Rack Storage Shutdown

- Automated rack storage systems are required to be provided with shutdown ***IF*** high-piled storage area > 500 sf
  - Manual shutdown switch
  - Automatic shutdown activated by either of the following:
    - Sprinkler water flow
    - Activation of fire detection system

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3305.5 Fire Watch – Demolition

- Fire safety plan is required
- Fire watch provided for demolition ***IF***:
  - Required by fire safety plan, or
  - Required by FCO

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3305.5.1 Fire Watch – New Construction

- Fire safety plan is required
- Fire watch provided for new construction ***IF***:
  - > 40' above lowest adjacent grade,
  - New multi-story construction > 50,000 sf per story,
  - Required by fire safety plan, or
  - Required by FCO

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3305.5.1 Fire Watch

- ***IF*** fire watch is required, it must be provided:
  - During nonworking hours
  - When construction >40' above lowest adjacent grade
- Fire watch personnel
  - Must be trained
  - Keep written log
- Fire watch for hot work is still required

This fire watch is different than fire watch for hot work

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Chapter 40 Distilled Spirits and Wines

- New chapter for storage of distilled spirits and wines
- Not classified as Group H
  - Group F-1 and S-1 for beverages > 16% alcohol content
  - Group F-2 and S-2 for beverages ≤ 16% alcohol content
- Chapters 50 and 57 do not apply to storage when in compliance with Chapter 40

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4003 Distilled Spirits and Wines

- Protection of storage areas
  - Spill control
    - 2nd containment not required
  - Ventilation
    - 1 cfm/ft², ***OR***
    - Monitored and ventilated to maintain ≤25% LFL
  - Control of ignition sources
    - No smoking
    - Listed equipment for hazardous (classified) areas
  - Lightning protection

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4004, 4005 Storage

- Fire sprinklers required if stored in basement and:
  - Class I cannot exceed MAQ for open-use systems
  - Class II or IIIA are not limited
- Fire sprinklers
  - Sprinklers required throughout Group F-1 fire areas used for manufacture of distilled spirits
  - Sprinklers required throughout Group S-1 fire areas used for bulk storage of distilled spirits or wine

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5001.1 Haz Mat Exceptions

- Correlation of Chapter 50 exceptions with other portions of the code
  - Flammable liquids in motor fuel-dispensing facilities – Chapter 23
  - Fuel oil in tanks and containers connected to oil-burning equipment – Section 603
  - Aerosol products – Chapter 51
  - Flammable or combustible liquids with a flash point > 95°F in a water-miscible solution – Chapter 57
  - Commercial cooking oil storage tank – Section 607

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5001.1, Exc. 10 Beer, Distilled Spirits and Wine

- Storage of beer, distilled spirits and wine is not classified as a hazardous material
- Exception 10 is revised to:
  - Add beer to the list of distilled spirits and wine
  - Remove the specification of wooden barrels

- Note this exception is only for storage
- It does exempt brewing, distilling or processing

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5001.1, Exc. 15 Flammable/Combustible Liquids

- Definitions of flammable liquid and combustible liquid have been revised
  - If flash point but no fire point, then it is not classified as a flammable or combustible liquid
- Consistent with Section 5701.2 Exception 7
  - Exception 15 added to Section 5001.1 to match Chapter 57
  - But if material has other haz mat characteristics, those classifications must be addressed

Flash Point is the minimum temperature at which a liquid will give off sufficient vapors to form anitan igble mixture with air near the surface or in the container, but will not sustain combustion.

Fire Point is the lowest temperature at which a liquid will ignite and achieve sustained burning when exposed to a test flame.

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5003.12 Outdoor Control Areas

- Section 5003.12 is specified as “general requirements”
- Sections 5004.14, 5005.3.3 and 5005.4.3 have been revised to state outdoor storage must comply with outdoor control area requirements, except where material specific requirements are found in the code or referenced standard

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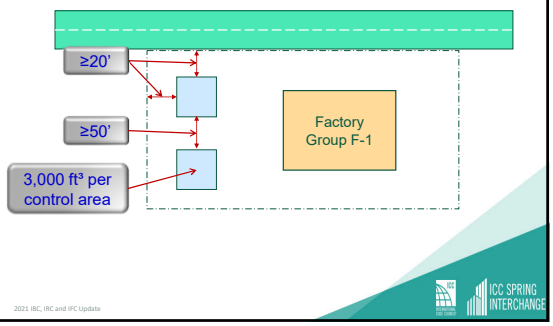
5003.12 Outdoor Control Areas

- Outdoor control area for flammable gas



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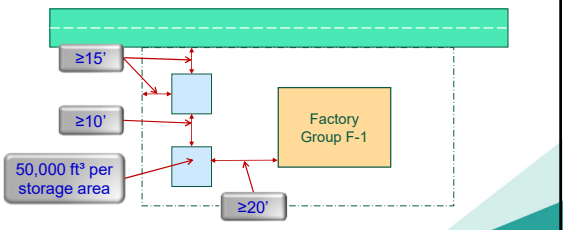
5003.12 Outdoor Control Areas

- Outdoor control area for gaseous H_2 – NFPA 2



98

5601.1.3 Consumer Use Fireworks

- Where allowed, the storage, use and handling of Division 1.4G fireworks shall comply with 2006 NFPA 1124
  - Display height ≤ 6'
  - Display height along wall ≤ 12'
  - Vertical flame breaks provided every 16' horizontally
  - ≥ 50% of floor area shall be aisles

Flame breaks constructed of:
- Sheet steel
- Sheet aluminum ≥0.010" thick
- Hardboard ≥⅛" thick
- Gypsum board ≥⅜" thick
- Wood panels ≥⅛" thick
- Plywood ≥¼" thick
- Particleboard ≥¼" thick
- Cement fiberboard
- Plastic laminate ≥⅛" thick
- Safety glass ≥⅛" thick
- Other approved material

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NFPA 1124 Consumer Use Fireworks

- Dead-end aisles are prohibited
- Exit access travel distance ≤ 75 feet
- Sprinklers required if new building > 6,000 sf
- Sprinklers required if existing building > 7,500 sf
- Smoke/heat vents required in new permanent buildings with ceiling height < 10' and exit access travel distance > 25'
- Temporary stands > 800 sf must meet all requirements of a permanent structure

ICC SPRING INTERCHANGE

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Questions?

ICC SPRING INTERCHANGE

101

ICC SPRING INTERCHANGE

2021 International Residential Code

INTERNATIONAL CODE COUNCIL

102

R102.7.1 Additions, Alterations or Repairs

- Not cause an existing building to be less compliant with the code
- Comply with height limits of IRC
- Where alteration causes use or occupancy to be changed to one not within the scope of IRC, the provisions of the IEBC apply.

2021 IBC, IRC and IFC Update

ICC SPRING INTERCHANGE

103

R301.2.1 Wind Design

- Updated Wind Speed maps match IBC and ASCE 7 maps with a large portion of the country having wind speeds less than 115 mph.

2021 IBC, IRC and IFC Update

ICC SPRING INTERCHANGE

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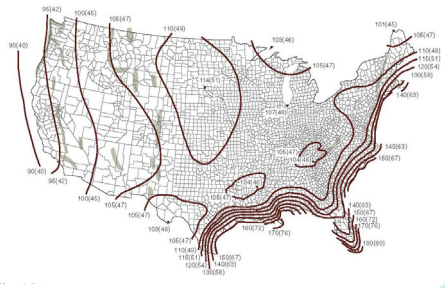

2021 IBC, IRC and IFC Update

ICC SPRING INTERCHANGE

105

Table R301.2.1(1) Components and Cladding

- Component and cladding wind pressures in Table R301.2.1(1) are updated for new design wind speeds and hip or gable roof profiles.

2021 IBC, IRC and IFC Update

106

Table R301.2.1(1) Components and Cladding

	Zone	Effective Wind Areas (ft^2)	Ultimate Design Wind Speed, V_{ult} 90		95		100		105		110		...		180	
			Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg
Gable Roof >7 to 20 degrees	1, 2e	10	5.4	-16.2	6	-18.0	6.7	-19.9	7.4	-22	8.1	-24.1	...	...	21.6	-64.6
	1, 2e	20	4.9	-16.2	5.4	-18	6.0	-19.9	6.6	-22	7.2	-24.1	...	...	19.4	-64.6
	1, 2e	50	4.1	-9.9	4.6	-11	5.1	-12.2	5.6	-13.4	6.1	-14.7	...	...	16.4	-39.4
	1, 2e	100	3.6	-5	4	-5.6	4.4	-6.2	4.8	-6.9	5.3	-7.5	...	...	14.2	-20.2
	2n, 2r, 3e	10	5.4	-23.6	6	-26.3	6.7	-29.1	7.4	-32.1	8.1	-35.2	...	...	21.6	-94.2
	2n, 2r, 3e	20	4.9	-20.3	5.4	-22.7	6	-25.1	6.6	-27.7	7.2	-30.4	...	...	19.4	-81.4
	2n, 2r, 3e	50	4.1	-16	4.6	-17.9	5.1	-19.8	5.6	-21.8	6.1	-24	...	...	16.4	-64.2
	2n, 2r, 3e	100	3.6	-12.8	4	-14.3	4.4	-15.8	4.8	-17.4	5.3	-19.1	...	...	14.2	-51.3
	3r	10	5.4	-28	6	-30.2	6.7	-34.6	7.4	-38.1	8.1	-41.8	...	...	21.6	-112
	3r	20	4.9	-24	5.4	-26.7	6	-29.6	6.6	-32.7	7.2	-35.9	...	...	19.4	-96
	3r	50	4.1	-18.7	4.6	-20.8	5.1	-23.1	5.6	-25.4	6.1	-27.9	...	...	16.4	-74.7
	3r	100	3.6	-14.7	4	-16.3	4.4	-18.1	4.8	-20	5.3	-21.9	...	...	14.2	-58.7

2021 IBC, IRC and IFC Update

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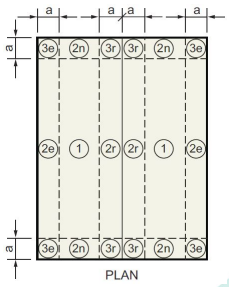
New vocabulary includes division of C&C corner and edge zones as follows:

2 – edge zones
2e – edge zone along bottom of roof above the soffit
2r – edge zone along roof peak
2n – edge zone along rake edge of gable roofs

3 – corner zones
3e – corner zone at bottom of roof above the soffit
3r – corner zone at roof peak

C&C interior zones:
1 – interior zone

a = 4 feet

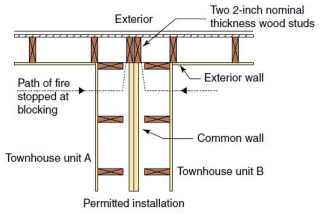


2021 IBC, IRC and IFC Update

108

R302.2 Townhouse Common Wall

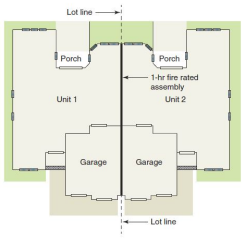
- Common walls separating townhouses can terminate at the inside of exterior walls:
  - Two 2-inch studs as fireblocking



109

R302.3 Two-Family Dwelling Separation

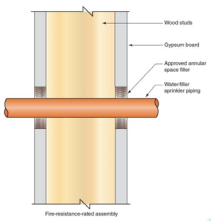
- One-hour separation whether or not a lot line exists between units



110

R302.4 Dwelling Unit Rated Penetrations

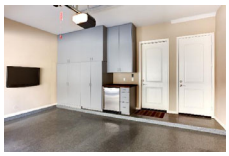
- Water-filled fire sprinkler piping of any approved material
  - does not require a firestop system
  - provided annular space is filled with the prescribed materials

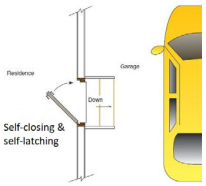


111

R302.5 Dwelling-Garage Opening Protection

- Door between the garage and residence must be self-latching.





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R303.1 Mechanical Ventilation

- Whole-house mechanical ventilation system or a mechanical ventilation system capable of producing 0.35 ACH in habitable rooms
- A local exhaust system is an acceptable substitute for natural ventilation in kitchens.

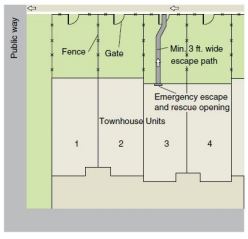
2021 IBC, IRC and IFC Update

ICC SPRING INTERCHANGE

113

R310.1 Emergency Escape and Rescue Opening Required

- Emergency escape and rescue openings require a clear 36-inch-wide path to a public way.
- Operation requirements have been clarified.



2021 IBC, IRC and IFC Update

ICC SPRING INTERCHANGE

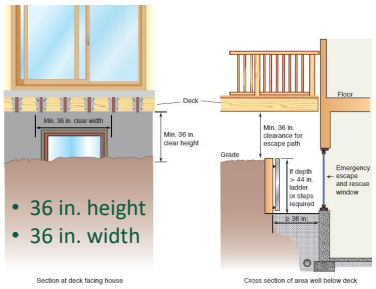
114

R310.2 Emergency Escape and Rescue Openings

- Emergency escape openings under decks, porches and cantilevers require a path not less than 36 in. in height and 36 in. in width.
- Dimensions have been clarified (placed in separate sections):
  - Minimum opening area
  - Minimum opening dimensions
  - Maximum ~~sill~~ height above floor

115

R310.2 Emergency Escape and Rescue Openings (continued)

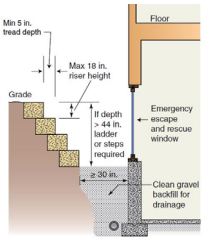


- 36 in. height
- 36 in. width

116

R310.3, R310.4 EERO Area Wells

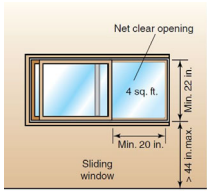
- Window wells and area wells merged into area wells.
- Dimensions are given for steps:
  - 5-inch minimum tread
  - 18-inch maximum rise
  - 12-inch minimum width



117

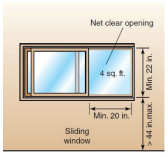
R310.5, R310.6, R310.7 EERO in Existing Buildings

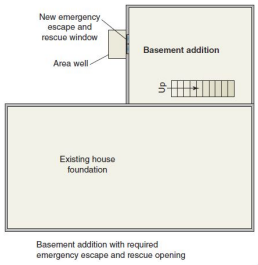
- 4 sf minimum clear opening permitted for EERO where:
  - Basement remodel
  - Basement addition
  - Change of occupancy



118

R310.5, R310.6, R310.7 EERO in Existing Buildings (continued)

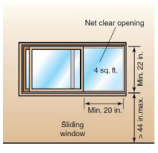


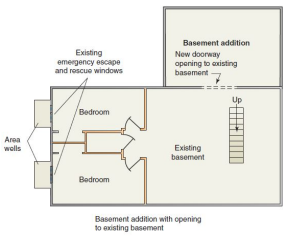


Basement addition with required emergency escape and rescue opening

119

R310.5, R310.6, R310.7 EERO in Existing Buildings (continued)



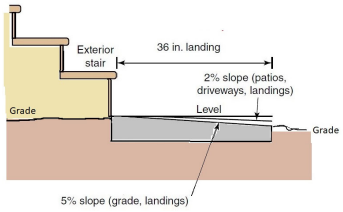


Basement addition with opening to existing basement

120

R311.7.7 Stairway and Landing Walking Surface

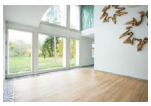
- New exception allows steeper slopes for exterior landings that also serve to drain surface water away from the building.

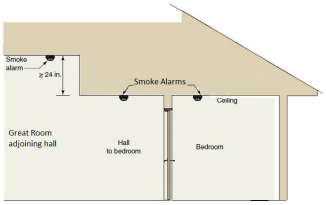


121

R314.3 Smoke Alarm Locations

- A new location requirement addresses high ceilings adjacent to hallways serving bedrooms.





Section drawing

122

R315.2.2 Carbon Monoxide Alarms

- Repairs to an existing fuel-fired mechanical system now trigger the retroactive requirements for carbon monoxide alarms.

123

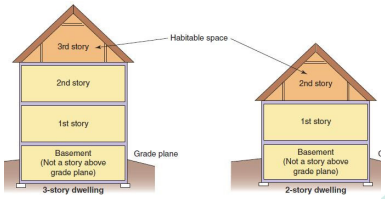
R324.6 Photovoltaic Systems

- Building-integrated photovoltaic (BIPV) systems meeting the specified criteria do not require firefighter access pathways and setbacks.

124

R326 Habitable Attics

- Habitable space above 2nd story or 1st story meets definition of story – no additional requirements



125

Table R403.1(1) Footing Width and Thickness

- Minimum footing size tables have been revised to more accurately reflect current practice.
- A 20 psf roof live load or 25 psf ground snow load are the lowest load assumed for the footing.

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Table R403.1(1) Footing Width and Thickness excerpt

Ground Snow Load or Roof Live Load	Story and Type of Structure with Light Frame	Load Bearing Value of Soil (psf)					
		1500	2000	2500	3000	3500	4000
20 psf Roof Live Load or 25 psf Ground Snow Load	1 story - slab on grade	12x6	12x6	12x6	12x6	12x6	12x6
	1 story - with crawl space	12x6	12x6	12x6	12x6	12x6	12x6
	1 story - plus basement	16x6 ~~18x6~~	12x6 ~~14x6~~	12x6	12x6	12x6	12x6
	2 story - slab on grade	13x6 ~~12x6~~	12x6	12x6	12x6	12x6	12x6
	2 story - with crawl space	15x6 ~~16x6~~	12x6	12x6	12x6	12x6	12x6
	2 story - plus basement	19x6 ~~22x6~~	14x6 ~~16x6~~	12x6 ~~13x6~~	12x6	12x6	12x6
30 psf	1 story - slab on grade	12x6	12x6	12x6	12x6	12x6	12x6
	1 story - with crawl space	13x6	12x6	12x6	12x6	12x6	12x6
	1 story - plus basement	16x6 ~~19x6~~	12x6 ~~14x6~~	12x6	12x6	12x6	12x6
	2 story - slab on grade	13x6 ~~12x6~~	12x6	12x6	12x6	12x6	12x6
	2 story - with crawl space	16x6 ~~17x6~~	12x6 ~~13x6~~	12x6	12x6	12x6	12x6
	2 story - plus basement	19x6 ~~23x6~~	14x6 ~~17x6~~	12x6 ~~14x6~~	12x6	12x6	12x6

127

R406.2 Foundation Waterproofing

- Six-mil polyvinyl chloride and polyethylene fabrics have been removed from the list of approved waterproofing materials.

2021 IBC, IRC and IFC Update

ICC SPRING INTERCHANGE

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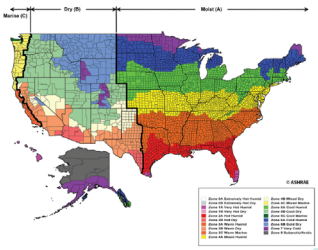
R408.8 Under-floor Vapor Retarder

- A Class I or II vapor retarder is required on exposed air permeable insulation between floor joists in Climate Zones 1A, 2A and 3A.



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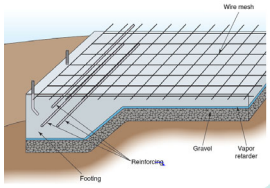
R506.2.3 Vapor Retarder

- Thicker vapor retarders are now required below slabs on grade.
- Minimum 10 mil (0.01 inch) thick



130

R507.3 Deck Footings

- Footings for freestanding decks on or near the ground have been clarified.

131

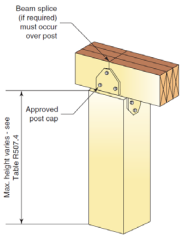
Table R507.3.1 Minimum Footing Size for Decks

LIVE OR GROUND SNOW LOAD (psf)	TRIBUTARY AREA (sq. ft.)	SOIL BEARING CAPACITY 1500 psf		
		Side of a square footing (inches)	Diameter of a round footing (inches)	Thickness (inches)
40	5	7	8	6
	20	10	12	6
	40	14	16	6
50	5	7	8	6
	20	11	13	6
	40	15	17	6
60	5	7	8	6
	20	12	14	6
70	5	7	8	6
	20	12	14	6

132

R507.4 Deck Posts

- The deck post height table has been expanded by adding the tributary area supported by a post and the wood species for determination of maximum post height.



133

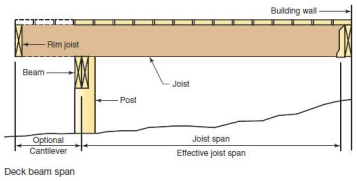
Table R507.4 Deck Post Height

Loads (psf)	Post Species	Post Size	Tributary Area (ft^2) 20	40	60	80	100	120	140	160
			Maximum Deck Post Height (feet-inches)							
50 Ground Snow Load	Southern Pine	4 x 4	14-0	12-2	9-10	8-5	7-5	6-7	5-11	5-4
		4 x 6	14-0	14-0	12-6	10-9	9-6	8-7	7-10	7-3
		6 x 6	14-0	14-0	14-0	14-0	14-0	14-0	14-0	13-4
		8 x 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
	Douglas Fir, Hem-fir, SPF	4 x 4	14-0	12-1	9-8	8-2	7-1	6-2	5-3	4-2
		4 x 6	14-0	14-0	12-4	10-7	9-4	8-4	7-7	6-11
		6 x 6	14-0	14-0	14-0	14-0	14-0	14-0	14-0	12-10
		8 x 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
	Redwood, W. Cedars, Pond. Pine, Red Pine	4 x 4	14-0	11-8	9-0	6-10	3-7	NP	NP	NP
		4 x 6	14-0	14-0	12-0	10-0	8-6	7-0	5-3	NP
		6 x 6	14-0	14-0	14-0	14-0	14-0	14-0	10-8	2-4
		8 x 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0

134

R507.5 Deck Beams

- The deck beam span table has been split into multiple tables providing spans for given deck live or snow loads. Single and multi-ply spans as well as options for cantilevered deck joists are listed.



135

Table R507.5(2) Max. Deck Beam Span – 50 psf Ground Snow Load

Beam Species	Beam Size	Effective Deck Joist Span Length (feet)						
		6	8	10	12	14	16	18
		Maximum Beam Span (feet-inches)						
Southern Pine	1-2x6	4-6	3-11	3-6	3-2	2-11	2-9	2-7
	1-2x8	5-9	4-11	4-5	4-0	3-9	3-6	3-3
	1-2x10	6-9	5-10	5-3	4-9	4-5	4-2	3-11
	1-2x12	8-0	6-11	6-2	5-8	5-3	4-11	4-7
	2-2x6	6-8	5-9	5-2	4-9	4-4	4-1	3-10
	2-2x8	8-6	7-4	6-7	6-0	5-7	5-2	4-11
	2-2x10	10-1	8-9	7-10	7-1	6-7	6-2	5-10
	2-2x12	11-11	10-3	9-2	8-5	7-9	7-3	6-10
	3-2x6	7-11	7-2	6-6	5-11	5-6	5-1	4-10
	3-2x8	10-5	9-3	8-3	7-6	6-11	6-6	6-2
	3-2x10	12-8	10-11	9-9	8-11	8-3	7-9	7-3
	3-2x12	14-11	12-11	11-6	10-6	9-9	9-1	8-7

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R703.2, R703.7.3 Water-resistive Barriers

- WRB material options include:
  - No. 15 felt complying with ASTM D226, Type 1
  - ASTM E2556, Type I or II
  - ASTM E331
  - Other approved materials
- WRB requirements for dry climates versus wet climates defined for stucco.

2021 IBC, IRC and IFC Update

ICC SPRING INTERCHANGE

137

R704 Soffits

- Requirements for soffit material and installation are expanded in a new section.

2021 IBC, IRC and IFC Update

ICC SPRING INTERCHANGE

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R704 Soffits

- R704.1 General wind limitations
- R704.2 Soffit installation where the design wind pressure is 30 psf or less
- R704.2.1 Vinyl soffit panels
- R704.2.2 Fiber-cement soffit panels
- R704.2.3 Hardboard soffit panels
- R704.2.4 Wood structural panel soffit
- R704.3 Soffit installation where the design wind pressure exceeds 30 psf
- R704.3.1 Vinyl soffit panels
- R704.3.2 Fiber-cement soffit panels
- R704.3.3 Hardboard soffit panels
- R704.3.4 Wood structural panel soffit

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Figure R704.2.1(1) Single Span Vinyl Soffit Panel Support

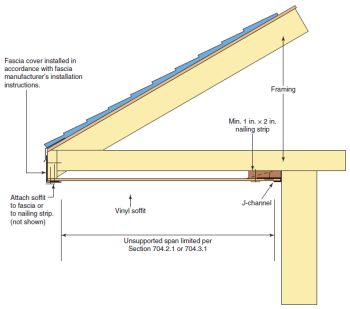

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Table R704.3.4 Prescriptive Alternative Nailing for a WSP Soffit

Maximum Design Pressure (+ or - psf)	Minimum Panel Span Rating	Minimum Panel Performance Category	Nail Type and Size	Fastener[a] Spacing Along Edges and Intermediate Supports	
				Galvanized Steel	Stainless Steel
30	24/0	3/8	6d box (2 x 0.099 x 0.266 head diameter)	6[f]	4
40	24/0	3/8	6d box (2 x 0.099 x 0.266 head diameter)	6	4
50	24/0	3/8	6d box (2 x 0.099 x 0.266 head diameter)	4	4
			8d common (2½ x 0.131 x 0.281 head diameter)	6	6
60	24/0	3/8	6d box (2 x 0.099 x 0.266 head diameter)	4	3
			8d common (2½ x 0.131 x 0.281 head diameter)	6	4
70	24/16	7/16	8d common (2½ x 0.131 x 0.281 head diameter)	4	4
			10d box (3 x 0.128 x 0.312 head diameter)	6	4
80	24/16	7/16	8d common (2½ x 0.131 x 0.281 head diameter)	4	4
			10d box (3 x 0.128 x 0.312 head diameter)	6	4
90	32/16	15/32	8d common (2½ x 0.131 x 0.281 head diameter)	4	3
			10d box (3 x 0.128 x 0.312 head diameter)	6	4

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R802 Wood Roof Framing

- Revised provisions clarify ridge beam and ceiling joist requirements.

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Table R802.5.2(1) Rafter/Ceiling Joist Heel Joint Connections

RAFTER SLOPE	RAFTER SPACING (inches)	GROUND SNOW LOAD (psf)											
		20[e]			30			50			70		
		Roof span (feet)											
		12	24	36	12	24	36	12	24	36	12	24	36
		Required number of 16d common nails per heel joint splice[a,b,c,d,f]											
3:12	12	3	5	8	3	6	9	5	9	13	6	12	17
	16	4	7	10	4	8	12	6	12	17	8	15	23
	19.2	4	8	12	5	10	14	7	14	21	9	18	27
	24	5	10	15	6	12	18	9	17	26	12	23	34
4:12	12	3	4	6	3	5	7	4	7	10	5	9	13
	16	3	5	8	3	6	9	5	9	13	6	12	17
	19.2	3	6	9	4	7	11	6	11	16	7	14	21
	24	4	8	11	5	9	13	7	13	19	9	17	26
5:12	12	3	3	5	3	4	6	3	6	8	4	7	11
	16	3	4	6	3	5	7	4	7	11	5	9	14
	19.2	3	5	7	3	6	9	5	9	13	6	11	17
	24	3	6	9	4	7	11	6	11	16	7	14	21
⋮													
12:12	12	3	3	3	3	3	3	3	3	4	3	3	5
	16	3	3	3	3	3	3	3	3	5	3	4	6
	19.2	3	3	3	3	3	4	3	4	6	3	5	7
	24	3	3	4	3	3	5	3	5	7	3	6	9

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R905.4.4.1 Metal Roof Shingle Wind Resistance

- Requirements for metal shingle wind resistance are added to Section R905.4.

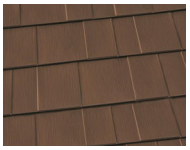

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Table R905.4.4.1 Classification of Steep Slope Metal Roof Shingles Tested per ASTM D3161

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ULT}, FROM FIGURE R301.2(5)A (mph)	MAXIMUM BASIC WIND SPEED, V_{ASD}, FROM TABLE R301.2.1.3 (mph)	ASTM D3161 SHINGLE CLASSIFICATION
110	85	A, D or F
116	90	A, D or F
129	100	A, D or F
142	110	F
155	120	F
168	130	F
181	140	F
194	150	F

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Questions?

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