State of Connecticut
Department of Administrative Services
Division of Construction Services
Office of Education and Data Management

2012 IBC Code Changes Chapters 1 - 10

Presented by
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for the

Office of Education and Data Management
Fall 2015 Career Development Series

Connecticut

2012 Building Code Changes
Chapters 1-10

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Background & History

- Evolution of Building Codes
  - Grew to include other structures associated with buildings.
  - Historical & Contemporary examples

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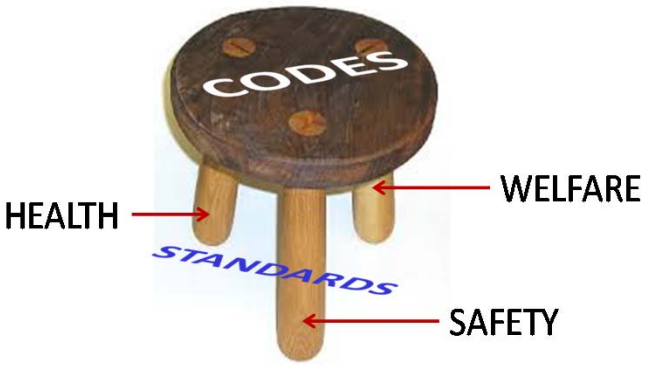
HSW: The Structure

Underlying Codes & Standards: "Maximum Acceptable Risk"



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Review of Basic HSW Principles

Code is MINIMUM allowable compliance.

Codes/Requirements/Standards

- **Hierarchy: state or Federal law/state regulation/ local ordinance.**

Maximum Acceptable Risk

- **Saving lives vs. property**
- **Cost/benefit considerations**

Work not requiring a permit.

- **Must still comply with applicable codes unless specifically relieved (e.g. historic).**

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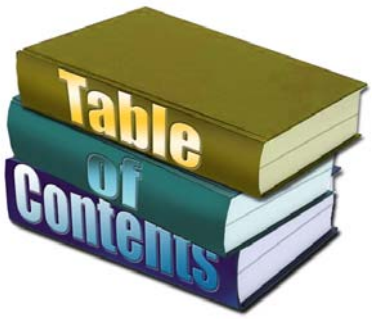
Code Organization & Layout

Project [IBC] v. Process [IRC] Format

- **IBC creates 'silos' of requirements that do not necessarily correlate with construction processes**
- **IRC follows steps from project design to foundation to the finish structure, then plumbing/mechanical/electrical**
- **Both use Appendices (an overlay strategy)**



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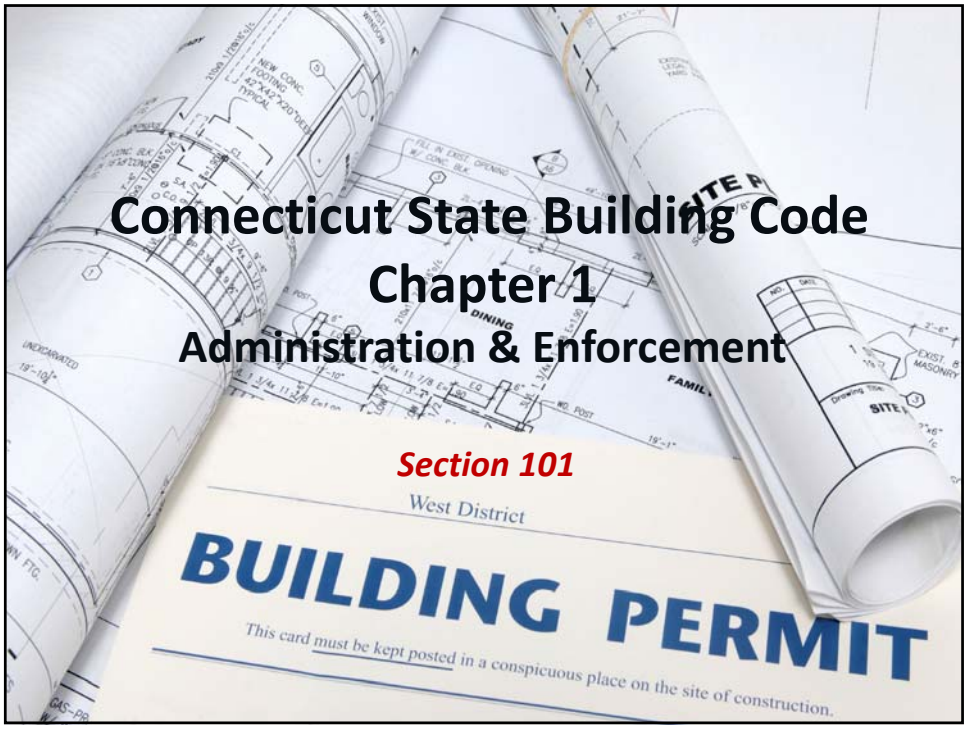

Connecticut State Building Code
Chapter 1
Administration & Enforcement

Section 101

New Code Adoptions

Section 101.1 – 29-252e & *29-292a, C.G.S

- **2012 International Building Code**
- **2009 ICC/ANSI A117.1 Accessibility Code**
- **2012 International Existing Building Code**
- **2012 International Plumbing Code**
- **2012 International Mechanical Code**
- **2012 International Energy Conservation Code**
- **2012 International Residential Code**
- **<u>2011</u> NFPA 70 National Electric Code**
- **2012 *International Fire Code**

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Errata Central

http://www.iccsafe.org/errata-central

- IBC 2012 had 30 changes between the first printing and third printing
- 6 changes are in Ch. 1-10

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NFPA Codes & Standards

IBC Chapter 35 Referenced Standards - NFPA

- **NFPA 13 Sprinkler Systems**
- **NFPA 14 Standpipe Systems**
- **NFPA 30 Flammable and Combustible Liquids**
- **NFPA 31 Oil-Burning Equipment**
- **NFPA 58 LPG Code**
- **NFPA 70 National Electrical Code**
- **NFPA 72 National Fire Alarm Code**
- **NFPA 96 Hoods**
- ***NFPA 101 Life Safety Code**
- **(and many others)**

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Where to Find, Purchase and Maintain

- 2012 IBC, IFC, IEBC, IMC, IPC, IECC
  - www.iccsafe.org/publications
  - Errata Central
- CT Amendments
  - CT Law Journal
  - www.ct.gov/dcs/

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Scope

Section 101.2 CT Amendments

Provisions of the Code for every building or structure apply to:

- Construction
- Alteration
- Enlargement
- Removal & Demolition
- Use & Occupancy
- Location

Or of any appurtenances connected to such buildings/structures

- Equipment
- Replacement
- Movement
- Repair
- Maintenance

www.ct.gov/dcs/cwp/view.asp?a=4447&q=522038

Local Enforcement

Section 104 - Duties & Powers – Building Official

- 104.1 enforce, adopt policies & procedures
  - 104.1.1 Establishes SBI & CSC as AHJ
- 104.2 Receive applications, review construction documents, issue permits, inspect premises, enforce code compliance.
- 104.3 et seq - Issue notices, conduct inspections, approve materials & equipment, keep department records, order tests and reports
- 104.6 Right of Entry by law – 29-261 C.G.S;
- 104.10 Modifications, variations, exemptions by SBI, not LBO
- 104.11 Approve alternative materials, design & methods of construction & equipment

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Work Requiring a Permit

Section 105.1 IBC + CT

Any owner or authorized agent who intends to do any of the following to a building/structure:

- Construct; Enlarge; Alter; Repair
- Move Structure / Lot Line
- Demolish or Change Occupancy

Or to any electrical, gas, mechanical or plumbing system:

- Erect / Install / Enlarge;
- Remove / Convert

Is required to apply for permit.

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Work Exempt From Permit

Section 105.2 CT Amendments

- Fences ≤ 7ft
- Retaining walls ≤ 3ft
- Water tanks ≤ 5,000gal
- Sidewalks, driveways, patios ≤ 30" above adjacent grade
- Non structural changes or alterations including painting, papering, tiling, carpeting etc.
- And More….

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Permit – Required Information

Section 107.2 – Required information with Permit Application

Town of Vernon - Building Department
55 West Main Street - Vernon, CT - 06066 - (860) 870-3633

BUILDING PERMIT APPLICATION

PERMIT #_____

ADDRESS OF WORK LOCATION: _____

TYPE OF PERMIT (Check one only)

BUILDING (List size/sq ft)	ELECTRICAL	PLUMBING	HVAC
☐Foundation_____	☐Service Change	☐New Residential	☐New Residential
☐Addition _____	☐CPSM_____	☐New Commercial	☐New Commercial
☐Acc Structure _____	☐New Residential	☐Addition	☐Addition
☐Deck_____	☐New Commercial	☐Fire Suppression	☐Central Air
☐Roofing (# Squares)____	☐Addition	☐Water Heater	☐Replace/Repair
☐Siding (# Squares) _____	☐Pool Wiring	☐Fuel Tank	☐Boiler/Furnace
☐Pool A/G ____ I/G____	☐Low Voltage	☐Other	☐Other
☐Other: _____	☐Other		

*For the issuance of a building permit – a Zoning Permit may be required.

Public Water Sewer Well Septic

DESCRIPTION OF WORK (must complete for all permits) _____

Fair Mkt Value (Labor+Material) $_____ Fees $_____ (B) $_____ (Z) $_____ (CO) $_____ (DF)

Check if building fee covers mechanical fee for: ☐E ☐P ☐H

Owner: _____ Applicant: _____

Address: _____ Address: _____

_____ Zip: _____ _____ Zip: _____

Phone # (Days): _____ Phone # (Days): _____

License# _____ Type: _____ Exp: _____

I understand that applying for this permit does not guarantee that it will be issued, and no work shall be done prior to the issuance of said permit or the approval of the **Building Official**. I agree to be in compliance with all applicable codes, standards, statues, and ordinances which may pertain. If other than the owner, applicant hereby certifies that they are authorized by the owner to make this application per C.G.S. 20-338b.

Applicant Signature: _____ Print Name: _____ Date: _____

Staff Member Check pertinent items and initial:

Planning_____ Wetlands_____ Health/WPCA_____ Fire Marshal _____

Worker's Comp_____ License verified_____ Zoning_____

Special Conditions or Comments: Per CT State Building Requirements, Inspections indicated on reverse must be called for-**Min 48 hrs. Notice Required**

Reviewed & Issued by: Date:

- Identify/ describe proposed work
- Location: description/street address
- Proposed use & occupancy
- Construction documents
- Value of proposed work
- Signed: applicant/owner or authorized agent
- Other information or data required for application.

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Submittals and Reviews

Section 107 CT Amendments

- 107.2 Construction Documents
- 107.3 Examination of documents
- 107.4 Amended construction documents
- 107.5 Retention of Construction Documents
- 107.6 Additional CT Requirements
  - CT Threshold limits
- 107.7 CT Lift Slab Construction

Use Group	Threshold Limit
I - Institutional	150 beds or persons
R-1 Residential	Single structure with 200 rooms
R-2 Residential	Single structure with 100 dwelling units
S - Storage	250,000 sf of parking structure with 1,000 cars

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Height and Area Submittal Information

Height & Area Limitations - (Partial Table *503*)

GROUP		TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
	HEIGHT (feet)	UL	160	65	55	65	55	65	50	40
		STORIES(S) AREA (A)								
A-1	S	UL	5	3	2	3	2	3	2	1
	A	UL	UL	15,500	8,500	14,000	8,500	15,000	11,500	5,500
A-2	S	UL	11	3	2	3	2	3	2	1
	A	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
A-3	S	UL	11	3	2	3	2	3	2	1
	A	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
A-4	S	UL	11	3	2	3	2	3	2	1
	A	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
A-5	S	UL	UL	UL	UL	UL	UL	UL	UL	UL
	A	UL	UL	UL	UL	UL	UL	UL	UL	UL
B	S	UL	11	5	3	5	3	5	3	2
	A	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000
E	S	UL	5	3	2	3	2	3	1	1
	A	UL	UL	26,500	14,500	23,500	14,500	25,500	18,500	9,500
F-1	S	UL	11	4	2	3	2	4	2	1
	A	UL	UL	25,000	15,500	19,000	12,000	33,500	14,000	8,500
F-2	S	UL	11	5	3	4	3	5	3	2
	A	UL	UL	37,500	23,000	28,500	18,000	50,500	21,000	13,000
H-1	S	1	1	1	1	1	1	1	1	NP
	A	21,000	16,500	11,000	7,000	9,500	7,000	10,500	7,500	NP
H-2	S	UL	3	2	1	2	1	2	1	1
	A	21,000	16,500	11,000	7,000	9,500	7,000	10,500	7,500	3,000
H-3	S	UL	6	4	2	4	2	4	2	1
	A	UL	60,000	26,500	14,000	17,500	13,000	25,500	10,000	5,000
H-4	S	UL	7	5	3	5	3	5	3	2
	A	UL	UL	37,500	17,500	28,500	17,500	36,000	18,000	6,500
H-5	S	4	4	3	3	3	3	3	3	2
	A	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000
I-1	S	UL	9	4	3	4	3	4	3	2
	A	UL	55,000	19,000	10,000	16,500	10,000	18,000	10,500	4,500
I-2	S	UL	4	2	1	1	NP	1	1	NP
	A	UL	UL	15,000	11,000	12,000	NP	12,000	9,500	NP
I-3	S	UL	4	2	1	2	1	2	2	1
	A	UL	UL	15,000	10,000	10,500	7,500	12,000	7,500	5,000

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Expiration of a Permit

Section 105.5 CT Amendments

- Work must be commenced within 180 days after permit issuance
- Building official is authorized to grant extensions for good cause

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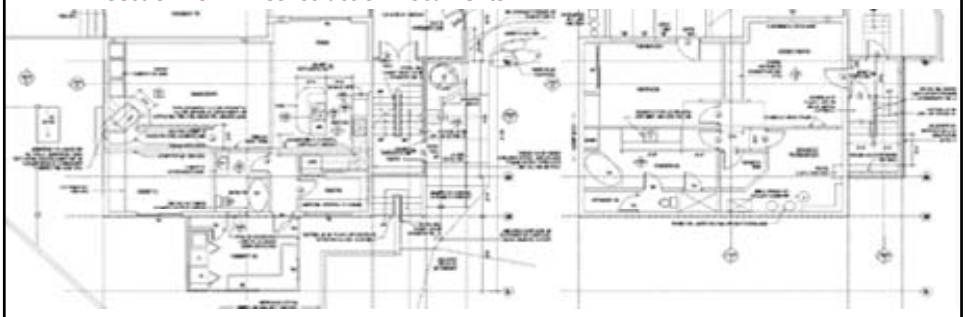
Information on the Documents

Section 107.2 – Construction Documents



- Documents indicate location, nature, extent of work, conformity to the code, laws, ordinances, rules, and regulations by the building official.
- 107.2.2 Submit fire protection system details as shop drawings.
- 107.2.3 Means of egress
- 107.2.4 Exterior wall envelope
- 107.2.5 Site Plan

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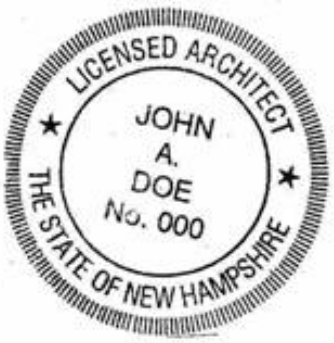
Fire Protection Shop Drawings

Section 107.2.2 CT Amendments

- Conform to Code and to CT Law
- Approved prior to start of installation
- Contain all information required per Chapter 9
- Drawings accompanied by evidence of licensure



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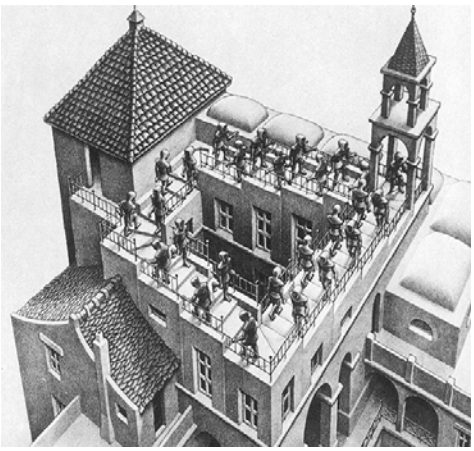
Information on Documents

Section 107.2.3 Means of Egress (MOE)



Construction Documents must designate:

- Location/Sizes/Construction of all portions M.O.E.
- Path of exit discharge
- # of occupants- each floor
- # in each room or space

Exception: Groups R-2, R-3, I-1

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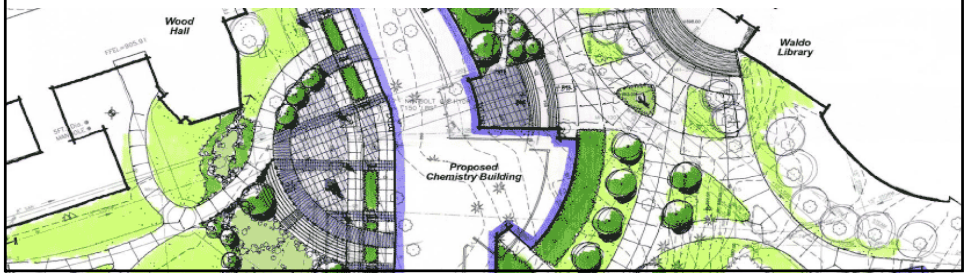
Information on Documents

Section 107.2.5 Site Plan

CD's shall show (to scale):

- Accurate boundary survey
- Established street grades
- New & Existing structures
- Other constructed features
- Lot line separations for all
- Any flood hazard areas/floodways/design elevations
- All proposed finish grades



Design Professional Required

Threshold Buildings – 107.6.2 & CT Law 29-276

Collapse of Hartford Civic Center

- Supplementary professional licensing requirements.
- Threshold limits – CGA 29-276 Use Groups:
  - Occupancy type, numbers; Height/Area
  - Independent, licensed 3rd party reviews/ statement of substantial compliance.
  - Lift-slab construction of any size.
- Does not apply to alterations, repairs or change of occupancy.

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Temporary Structures and Uses

Section 108 CT Amendments Temporary Structures & Uses

- 108.1 180-day limit; extension possible
  - Membrane structures (tents, canopies, etc. – see section 3103)
- 108.3 Temporary Power
- 108.4 Termination of Approval

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Emergency Measures

(ADD) CT 117.0 Requirements

- 117.1 Imminent risk of structural failure or collapse, in whole or in part: vacate & post.
- 117.2 Temporary Safeguards: Building Official may order work to make conditions safe.
- 117.3 Temporary Closings: Building/Structure; adjacent sidewalks, streets, public ways & structures.
- 117.4 Emergency Work: Make premises safe; up to & including demolition **
- 117.5 Costs: Paid by municipality; lien against the property to recover expenses

***Note. CGS Chapter 541, Part IV, section 29-406 requires demolition permits from local Building Official for all buildings/structures, including buildings and structures owned by the state or Federal governments*

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Vacant Buildings

(ADD) 118 Vacant Buildings

- **118.1 Abandoned premises: Unprotected/unsecured; illegally occupied; or a public danger per 117.1**
- **118.2 Secure, protect & safeguard; maintain or place sprinklers/ standpipes out of service; remove combustible materials**
- **118.3 Fire separation: Remove all collections of combustible materials, waste, rubbish from premises.**
- **Removal of HAZMAT**

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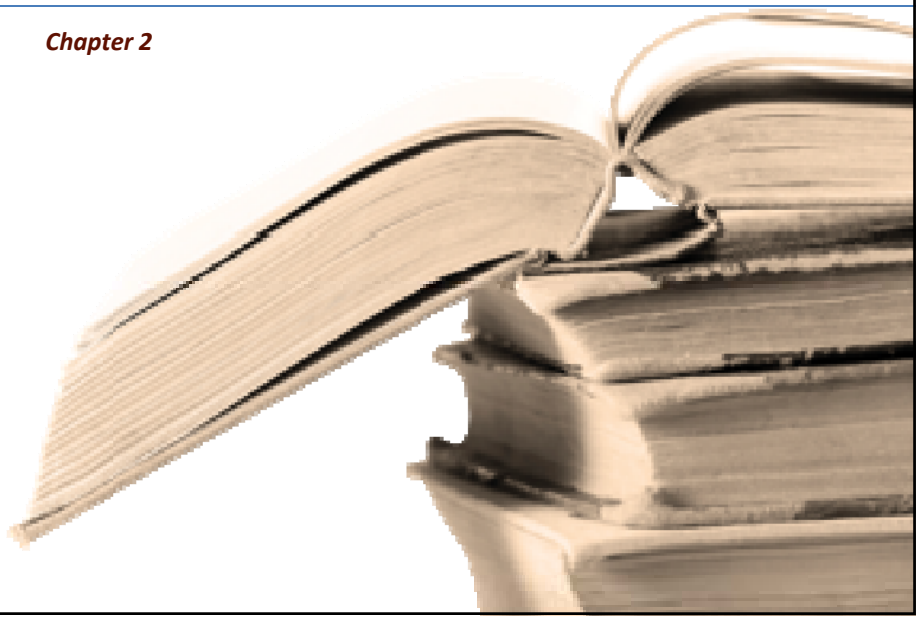
Definitions, Acronyms

Chapter 2



Definitions, Acronyms

Section 201 General Information

- Special meaning for common terminology.
- Different meanings in different codes
  - Adopted as portions of 2005 State Building Code definitions will remain same.
- ICC does not do ACRONYMS
- Interchangeability between different I-Codes
- Do not apply to statutory provisions
- Pay attention to "and" / "or" multiple exceptions

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Definitions, Acronyms

Section 201 – CT Amendments – Definitions Added or Amended

Added

- BED & BREAKFAST ESTABLISHMENT
- COMPLEX, GUEST ROOM, HOTEL
- SELF-PRESERVATION, STORY
- STREET FLOOR
- SUNROOM (greenhouse undefined)

Amended

- BUILDING, EXISTING.
- EXISTING STRUCTURE
- FIRE SEPARATION DISTANCE
- REGISTERED DESIGN PROFESSIONAL
- SPECIAL AMUSEMENT BUILDING

Acronyms – None in ICC

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Definitions, Acronyms

Section 202 (AMD) IBC Definitions

- **AMBULATORY CARE FACILITY**. ...24-hour basis to ~~individuals~~ **persons** who…
- **CUSTODIAL CARE**. includes ~~occupants~~ **persons receiving care** who…
- **FIRE PROTECTION RATING**. Section ~~715~~ **716**.
- **FIRE SEPARATION DISTANCE**. #3 … two buildings on the ~~property~~ **lot**.
- **HURRICANE-PRONE REGIONS**. ..~~Risk Category II buildings~~…1609.2/**Appdx.N**
- **SPECIAL INSPECTION/SPECIAL INSPECTOR**. *"Approved* agency"
- **TECHNICALLY INFEASIBLE**. An alteration of a ~~building or a~~ facility that…
- **VAPOR-PERMEABLE ~~MEMBRANE~~**. Moisture vapor permeance of **5** ~~10~~ perms (**2.9** ~~5.7~~ x 10-10kg/Pa.s.m2) or greater.
- **VEHICLE BARRIER**. .. near open sides or walls of ~~a~~ garage ~~floor~~ floors or ~~ramp~~ ramps ~~or building walls~~ that ~~act~~ acts as a ~~restraints~~ restraint for vehicles.
- **WIND-BORNE DEBRIS REGION**. ~~#2 In areas where the ultimate design wind speed is 140 mph or greater; or Hawaii~~. **(SEE APPENDIX 'N')**

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Wind-Borne Debris

Section 1609 references Appendix N – CT

MUNICIPALITY - SPECIFIC STRUCTURAL DESIGN PARAMETERS

Municipality	Ground Snow Load (psf)	MCE Spectral Accelerations (%g)		Wind Design Parameters: Ultimate Design Wind Speeds, *V ult* (mph)			Nominal Design Wind Speeds, *V asd* (mph)			Wind-Borne Debris Regions		Hurricane-Prone Regions
		S_s	S_1	Risk Cat.I	Risk Cat.II	Risk Cat.III-IV	Risk Cat. I	Risk Cat. II	Risk Cat. III-IV	Risk Cat. II & Risk Cat. III except Occupancy I-2	Risk Cat. III Occupancy I-2 & Risk Cat. IV	
Wilton	30	0.231	0.068	110	120	130	85	93	101			X
Winchester	40	0.177	0.065	105	120	125	81	93	97			X
Windham	30	0.173	0.062	120	130	140	93	101	108			X
Windsor	35	0.179	0.064	115	125	135	89	97	105			X
Windsor Locks	35	0.177	0.064	110	125	130	85	97	101			X
Wolcott	35	0.187	0.064	110	125	130	85	97	101			X
Woodbridge	30	0.191	0.063	115	125	135	89	97	105			X
Woodbury	35	0.194	0.065	110	120	130	85	93	101			X
Woodstock	40	0.172	0.063	120	130	140	93	101	108			x

Wind-Borne Debris Regions: Type A: Full Municipality
Type B: Within one mile of coastal mean high-water line (south of I-95 as CT Building Code Basis)
Type C: Within one mile of coastal mean high-water line (Building Code Basis for New Haven – South of Metro North/Amtrak RXR for points west of Quinnipiac River; South of I-95 for points east of Quinnipiac River)

Hurricane-Prone Regions: Municipalities in which Ultimate Wind Speed for Risk Category II Buildings exceeds 115 mph.

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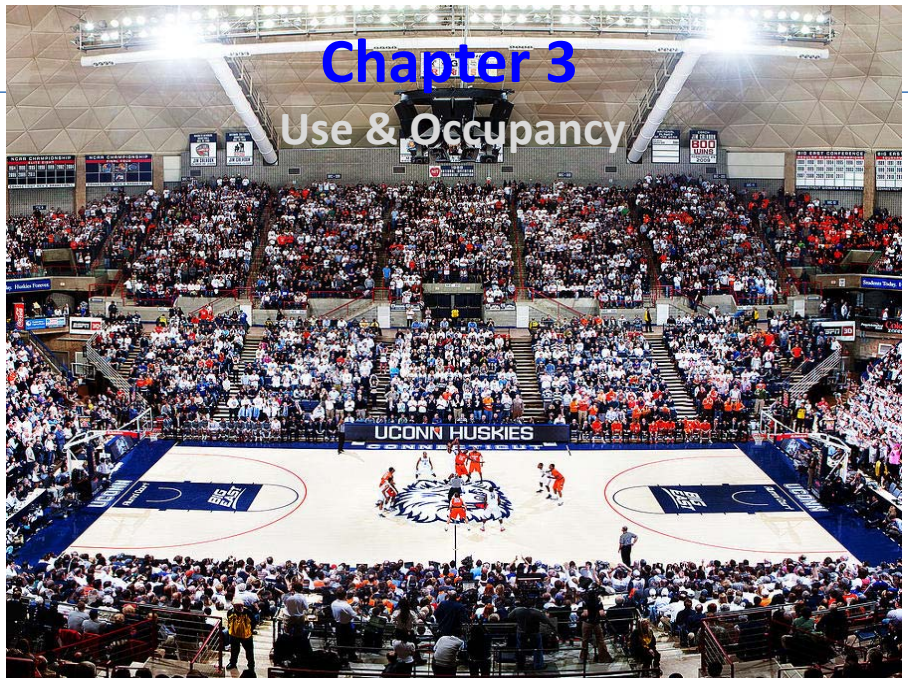

Chapter 3

Use & Occupancy

Classification of Use & Occupancy

Section 302 IBC Classification - General

- Major Use Groups
  - hierarchy within subgroups.
  - how characteristics are dissimilar.
- Activity type; Familiarity, type.
- Sub-Classification w/Fire Code
- Addition of new subsections.
- New definitions added.
- Section numbers slightly different than those of 2003.

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Use & Occupancy – Group A

Section 303 Group A: Assembly

General:

- **A-1 – fixed seating**
- **A-2 – food and/or drink consumption**
- **A-3 – general assembly✓**
- **A-4 – indoor sporting events with spectator seating**
- **A-5 – outdoor sporting events**
  - ✓ ***Exception – assembly spaces < 50 people or < 750 sf can be treated as Use Group B***

NEW IBC Sub-Sections:

- **303.1.1 Small Buildings & Tenant Spaces (CT amends)**
- **303.1.2 Small Assembly Spaces**
- **303.1.3 Associated w/ Group E occupancies**
- **303.1.4 Accessory to places of religious worship**

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Use & Occupancy – Group B

Section 304.1 Business

- Airport traffic control towers
- ***Ambulatory care facilities*** **(CT FSC)**
- Animal hospitals, kennels and pounds
- Banks
- Barber and beauty shops
- Car wash
- Civic administration
- ***Clinic, outpatient*** **(IBC)**
- Dry cleaning
- Educational occupancies for students above the 12th grade
- And More……

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Use & Occupancy - Group E

Section 305 Group E: Educational

New Sub-Sections

- Schools for 6+ people ≤ 12th grade
  - **305.1.1 Accessory to places of religious worship: classified as Group A-3**
- Day care for 5+ children at least age 2.5 years old.
  - **305.2.1 within places of religious worship**
  - **305.2.2 Five or fewer children**
    - **Five or fewer children in a dwelling unit classified as Group R-3**

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Use & Occupancy – Group F

Section 306 Group F: Factory

- **F-1 moderate-hazard** – all factory industrial uses **not** classified as Use Group F-2:
  - Aircraft manufacturing
  - Automobiles
  - **Food processing & commercial kitchens not associated with restaurants/cafes**
  - And Many More…

- **F-2 low-hazard** –industrial fabrication/ manufacturing of noncombustible materials:
  - Brick & Masonry
  - Metal products
  - Beverages

Use and Occupancy – Group H

Section 307 Group H – High Hazard

- **H-1** – detonation hazard
- **H-2** – deflagration or accelerated burning hazard
- **H-3** – readily supports combustion or poses physical hazard
- **H-4** – health hazard
- **H-5** – semiconductor fabrication and similar R&D
- Detached Building (IBC errata)

- **307.1 Lots of new exceptions for uses (13) added.**
- **307.1.1 New H-Use Requirements (IFC 415)**
- **307.2 New Definitions moved to Chapter 2:**
  - **Baled Cotton (AMD)**
  - **Baled Cotton; Densely Packed (ADD)**
  - **Day Box (ADD – H1 storage method)**
  - **Inert Gas**

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Use & Occupancy – HAZMAT Exempted Amounts

Section 307.1.1 – Group H: High Hazard

TABLE 307.1(1) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, j, m, n, p] [F]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustible liquid[c, i]	II IIIA IIIB	H-2 or H-3 H-2 or H-3 N/A	N/A	120[d, e] 330[d, e] 13,200[e, f]	N/A	N/A	120[g] 330[g] 13,200[f]	N/A	N/A	30[g] 80[g] 3,300[f]
Combustible fiber	Loose Baled[o]	H-3	(100) (1,000)	N/A	N/A	(100) (1,000)	N/A	N/A	(20) (200)	N/A
Consumer fireworks (Class C, Common)	1.4G	H-3	125[d, e, l]	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cryogenics, flammable	N/A	H-2	N/A	45[g]	N/A	N/A	45[g]	N/A	N/A	10[g]
Cryogenics, inert	N/A	N/A	N/A	N/A	NL	N/A	N/A	NL	N/A	N/A
Cryogenics, oxidizing	N/A	H-3	N/A	45[g]	N/A	N/A	45[g]	N/A	N/A	10[g]
Explosives	Division 1.1 Division 1.2 Division 1.3 Division 1.4 Division 1.4G Division 1.5 Division 1.6	H-1 H-1 H-1 or H-2 H-3 H-3 H-1 H-1	1[c, g] 1[c, g] 5[c, g] 50[c, g] 125[d, e, l] 1[c, g] 1[c, g]	(1)[c, g] (1)[c, g] (5)[c, g] (50)[c, g] N/A (1)[c, g] N/A	N/A N/A N/A N/A N/A N/A N/A	0.25[g] 0.25[g] 1[g] 50[g] N/A 0.25[g] N/A	(0.25)[g] (0.25)[g] (1)[g] (50)[g] N/A (0.25)[g] N/A	N/A N/A N/A N/A N/A N/A N/A	0.25[g] 0.25[g] 1[g] N/A N/A 0.25[g] N/A	(0.25)[g] (0.25)[g] (1)[g] N/A N/A (0.25)[g] N/A
Flammable Gas	Gaseous Liquefied	H-2	N/A	N/A (150)[d, e]	1,000[d, e] N/A	N/A	N/A (150)[d, e]	1,000[d, e] N/A	N/A	N/A
Flammable liquid[c]	1A 1B and 1C	H-2 or H-3	N/A	30[d, e] 120[d, e]	N/A	N/A	30[g] 120[g]	N/A	N/A	10[g] 30[g]
Flammable liquid, combination (1A, 1B, 1C)	N/A	H- 2 or H-3	N/A	120[d, e, h]	N/A	N/A	120[d, h]	N/A	N/A	30[d, h]

AKF

Use & Occupancy - Institutional

Section 308 – Group I

General:

- (AMD) **308.6 Group I-4 – Adult and child day care facilities.**
  - (AMD) **308.6.1 Adult care facility**
    - **Group A-3** if incapable of responding to emergency w/o help.
  - (AMD) **308.6.2 Child care facility**
    - **Group E** if located on level of exit discharge w/ exit door leading directly to exterior.
    - Group R-3 if Family day care home ≤ 6 children
  - Coordinates w/state fire code

AKF

Use & Occupancy - Mercantile

Section 309.1 – Group M

- Display and sale of merchandise
- Includes C-stores dispensing motor fuels
  - ✓ Subject to special increased storage limits for hazardous materials; Table 414.2.5

AKF

Use & Occupancy - Residential

Section 310 – Group R: CT Amendments

New terms added:

- **Bed & Breakfast Establishment**
- **Guest Room**
- **Hotel**

- 3010.3 R-1 – transient hotels, motels; b&b's
- 310.4 R-2 – non-transient apartments, dormitories
- 310.5 R-3 – Adult and child day care for < 5 people, < 24-hrs
- 310.6 R-4 – Residential care/assisted living with 5 to 16 people excluding staff

AKF

Chapter 3 – Classification of Use & Occupancy

Section 311 – Group S: Storage

- S-2 low-hazard – storage of noncombustible materials
- S-1 moderate-hazard – storage uses not classified as Use Group S-2

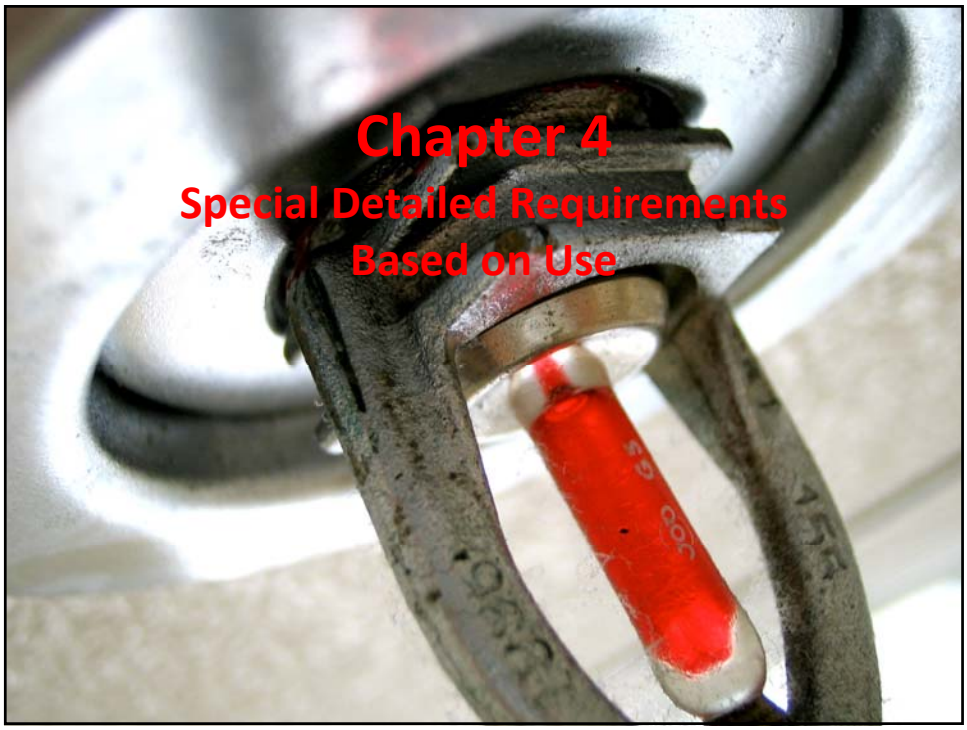
AKF

Chapter 3 – Classification of Use & Occupancy

Section 312 – Group U: Utility & Miscellaneous

- Carports/Private Garages
- Barns/Sheds
- Fences > 6 ft and retaining walls
- Tanks/Towers
- Retaining wall guards

AKF



Special Detailed Requirements

General Information

- Some sub-sections deleted from previous 2003 edition.
- New definitions added to existing terms.

- NEW sections introduced in 2012; mostly by IBC
- 419 Live / Work Units
- 420 Groups I-1, R-1, R-2, R-3
- 421 Hydrogen Cutoff Rooms
- 422 Ambulatory Care Facilities (including CT 420)
- 423 Storm Shelters
- 424 Play Structures Within Buildings
- 425 Group E Preschool and Primary Occupancies

AKF

Covered Mall Buildings

Section 402 Large Mixed-Use Spaces

- 402.1.1 Must be surrounded on all sides by permanent open space.
- 402.1.2 Perimeter line shall be established.

AKF

High Rise Buildings

Section 403 Buildings over 420 feet high

403.2 ~~Automatic Sprinkler System –~~ Construction

403.2.1.1 Reductions in the minimum fire-resistance rating of building per Table 601:

- Buildings ≤ 420 feet height, in Type IA construction permitted to be reduced to the min. *fire-resistance ratings* for the building elements in Type IB..

TABLE 403.2.4
MINIMUM BOND STRENGTH

HEIGHT OF BUILDING[a]	SFRM MINIMUM BOND STRENGTH
Up to 420 feet	430 psf
Greater than 420 feet	1,000 psf

Table 601 Fire-Resistance Rating Requirements for Building Elements (hrs)

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[d]	B	A[d]	B	HT	A[d]	B
Primary structural frame[g] (see Section 202)	3[c]	2[c]	1	0	1	0	HT	1	0
Bearing walls Exterior[f, g] Interior	3 3[c]	2 2[c]	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[e]	0	0	0	0	0	0	See Section 602.4.6	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)	1½[b]	1[b,c]	1[b,c]	0[c]	1[b,c]	0	HT	1[b,c]	0

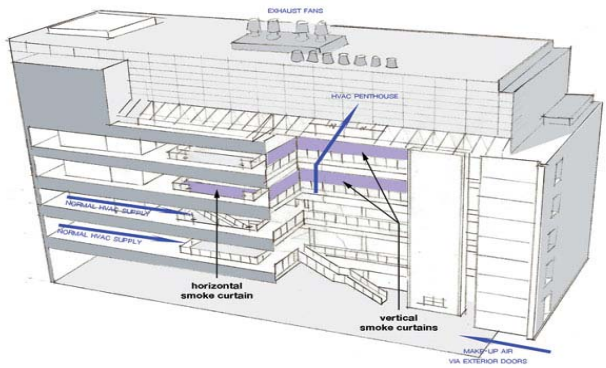
AKF

Atriums

Section 404.3 Automatic Sprinkler Protection

- 404.1.2 Not applicable to vertical openings in Group R-1 bed & breakfast
- (**AMD**) 404.3 Automatic sprinkler system installation required.
- 404.4 Fire Alarm system required
- **404.5 Smoke control system required for buildings connecting > 2 stories.**

404.6 Exception: *Glazed wall substitute for fire barrier under 3 distinct conditions*



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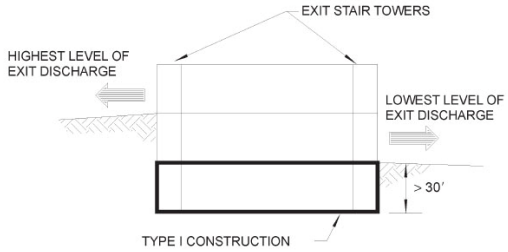
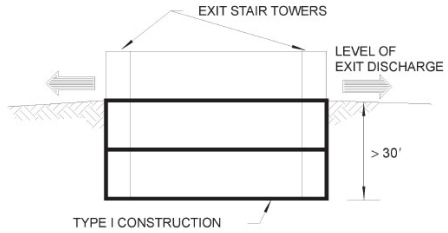
Underground Buildings

Section 405 Construction requirements





AKF

Motor Vehicle-Related Occupancies

Section 406 Garages; Fuel Dispensing; Repairs

- 406.2 Definitions:
  - Mechanical-Access Open Parking Garages
  - Open Parking Garage
  - Ramp-Access Open Parking Garages
- **406.3.4 Separation of private garages (AMD)**
  - **Garage walls, Ducts**
- **406.4** Public Parking Garages **amends height, guards & barriers (IBC)**
- 406.5 Open Parking Garages
- **406.7** Motor fuel-dispensing facilities
- 406.8 Repair garages

Table 406.5.4 Open Parking Garages Area & Height

TABLE 406.5.4
OPEN PARKING GARAGES AREA AND HEIGHT

TYPE OF CONSTRUCTION	AREA PER TIER (square feet)	HEIGHT (in tiers)		
		Ramp access	Mechanical access	
			Automatic sprinkler system	
			No	Yes
IA	Unlimited	Unlimited	Unlimited	Unlimited
IB	Unlimited	12 tiers	12 tiers	18 tiers
IIA	50,000	10 tiers	10 tiers	15 tiers
IIB	50,000	8 tiers	8 tiers	12 tiers
IV	50,000	4 tiers	4 tiers	4 tiers

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

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Medical Care Group I-2

Section 407 Egress; Protections; Exceptions; Compliance Option

- ***407.2 Corridors Continuity & Separation***
  - *407.2.1 Waiting Areas open to corridor, not occupied as sleeping room/treatment room etc, protected by automatic fire detection system, & smoke compartment protected by automatic fire detection system.*
- ***407.2.2 Care Providers' Stations permitted to be open to corridors***
- ***407.2.3 Psychiatric Treatment Area permitted to be open to corridors if :***
  - *Each area ≤ 1,500sf, located to allow for supervision by staff, area arranged so as not to obstruct any required exits, equipped with an automatic fire detection system, one space per one smoke compartment, walls & ceilings constructed as required for corridors.*
- ***407.2.4 Gift Shops ≤ 500 sf permitted to be open to corridor***
- ***407.4 Means of Egress***
  - ***(AMD) 407.11 Locking devices not restrictive of the MOE from patient room***
    - *Unlocking of all devices required to move a patient from smoke compartment to refuge area.*
- ***407.11 Outside door or window per patient room***
- ***407.12 Laboratories protected under NFPA 99-2002***
- ***407.13 Anesthetizing locations protected***
- ***407.14 Medical gas***
- ***407.15 Small group home alternative compliance***

AKF

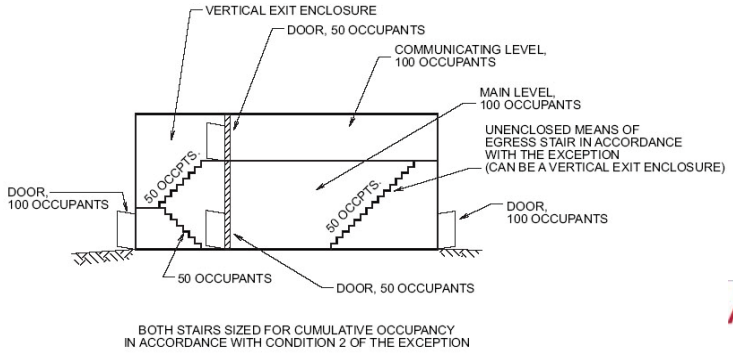
Prisons, Jails, Confined Care

Section 408 Group I-3 Institutional

408.1.1 Definitions
- Cell
- Cell Tier
- Housing Unit
- Sallyport

- *408.3.8 Interior exit stairway & ramp construction* ***(NEW)***
- *408.5 Vertical Openings protected by a shaft enclosure (Definition Change)*
- ***408.7 Security Glazing (NEW)***
- ***408.10 Fire Alarm System (NEW)***

Figure 408.5(2) Group I-3 Commentary



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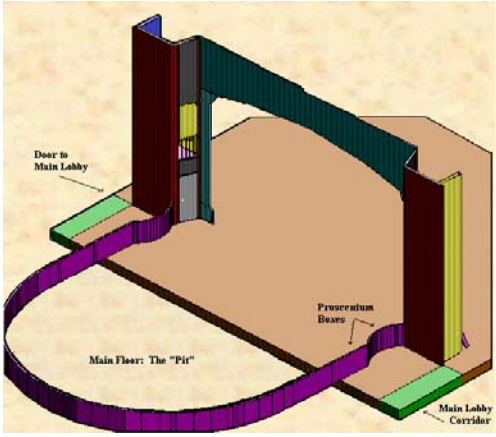
Stages and Platforms

Section 410 Protections and Safety Features

- Definitions:
  - ~~Fly Gallery, Girdiron, Pin Rail~~ ***Deleted***
  - ***410.2 Proscenium Wall, Technical Production Area (NEW)***
- ***410.6 Means of Egress (AMD)***
- 410.7 Automatic sprinkler system required
- 410.8 Standpipe system required



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HAZMAT

Section 414 Hazardous Materials
Table 414.2.2 Design and # of Control Areas

[F] TABLE 414.2.2
DESIGN AND NUMBER OF CONTROL AREAS

FLOOR LEVEL		PERCENTAGE OF THE MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA[a]	NUMBER OF CONTROL AREAS PER FLOOR	FIRE-RESISTANCE RATING FOR FIRE BARRIERS IN HOURS[b]
Above grade plane	Higher than 9	5	1	2
	7-9	5	2	2
	6	12.5	2	2
	5	12.5	2	2
	4	12.5	2	2
	3	50	2	1
	2	75	3	1
	1	100	4	1
Below grade plane	1	75	3	1
	2	50	2	1
	Lower than 2	Not Allowed	Not Allowed	Not Allowed

- **414.2 Control areas**
  - ***414.2.4 Fire-resistance-rating requirements (NEW SUB-SECTION)***
    - ***Fire-resistance-rating ≥ 2hrs***

Exception: *Allowed to be* ***1hr*** *fire-resistance rated in buildings of* ***Types IIA, IIIA, & VA*** *construction provided there is automatic sprinkler system in* ***building ≤ 3 stories*** *above grade.*

- **414.7.2 Dispensing, use & handling**
  - *Emergency telephone system, local manual alarm station*
- **414.7.3 (ERRATA) Supervision and monitoring**

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HAZMAT (continued)

Section 415 High hazard occupancies: Reorganization w/extensive IBC & CT amendments

- **415.2 *NEW* Definitions:**
  Detached Building,
  Physiological Warning
  Threshold Level

- ***415.3 Automatic Fire Detection System*** *required* ***(NEW)***
- ***415.4 Automatic Sprinkler System*** *required* ***(NEW)***
- ***415.5 Fire Separation Distance (NEW)***
  - *In Groups H-2 & H-3 not < 25% of perimeter wall shall be an exterior wall.*
  - ***Exceptions****: Liquid use w/floor area ≤ 500 sf, Liquid storage rooms w/ floor area ≤ 1,000 sf, Spray paint booths*

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Special Requirements

Section 416 Application of Flammable Finishes

- ***416.4 Spray booths (2009 NEW)***
- 416.5 Fire protection provided

AKF

Residential Groups I-1, R-1, R-2, R-3

NEW Section 420

- ***420.2 Separation Walls***
- ***420.3 Horizontal Separation***
- ***420.4 Automatic Sprinkler System***
- ***420.5 Smoke Detection & Fire Alarm System***

Hydrogen Cutoff Rooms

New Section 421

- ***421.2 Definitions:***
  - ***Gaseous Hydrogen System, Hydrogen Cutoff Room***
  - ***421.3 Location***
  - ***421.4 Design & Construction***
  - ***421.5 Ventilation***
  - ***421.6 Gas Detection System***
  - ***421.7 Explosion Control***
  - ***421.8 Standby Power***

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Ambulatory Care Facilities

NEW Section 422 – Use Group B

- *422.2 Separation*
- *422.3 Smoke compartments*
- *422.4 Refuge area*
- *422.5 Independent egress*
- *422.6 Automatic sprinkler systems*
- *422.7 Fire alarm systems*

AKF

Storm Shelters

NEW Section 423

- *423.2 Definitions:*
  - *Storm Shelter, Community storm shelter, Residential storm shelter*

AKF

Children's Play Structures

NEW Section 424

424. 2 Materials

424.3 Fire protection

424.4 Separation

424.5 Area limits

Group E

NEW SECTION 425

- ***425.6.1 Proximity to the level of exit discharge***
  - ***419.1.1 Preschool, kindergarten & first grade located on level of discharge***
  - ***419.1.2 Second grade rooms located not more than 1 story above level of discharge***
- ***425.2 Fire barriers – Group E occupancies subdivided into compartments by smoke barriers***

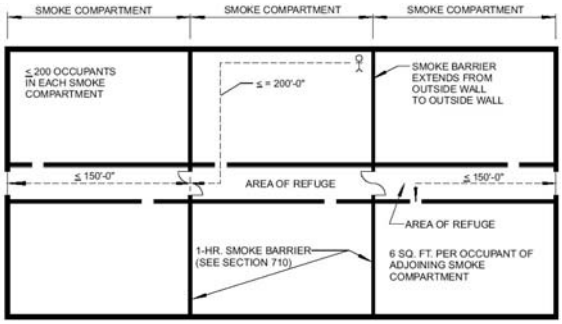

Image 408.6.1 2009 Commentary

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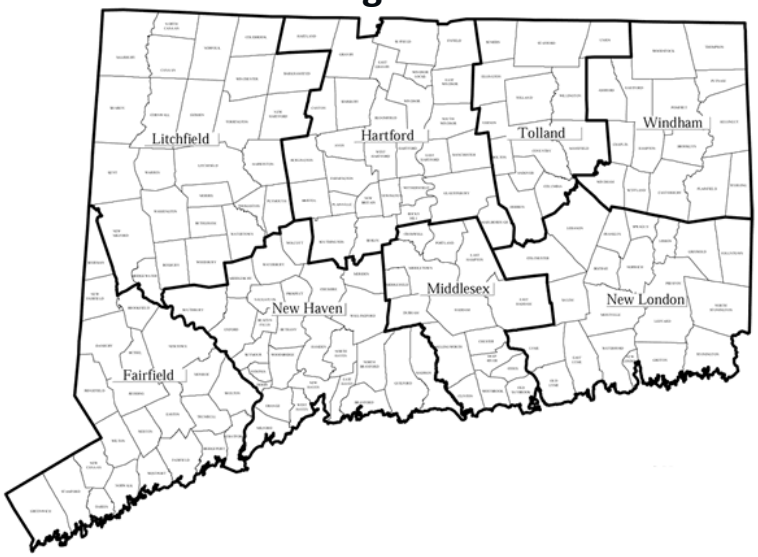
Chapter 5

Height & Area



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General Information

Section 501.1 Scope: Structures and Their Additions

Changes:

- Definition changes
- Deleted Sub-Sections
- Change in wording
- 2 New Sections 509 & 510

Based on 3 main items:

- Open perimeter
- Fire Separation/Suppression
- Mixed occupancy

Special Conditions:

- Unlimited area buildings
- Open parking structures

- **Definitions in Chapter 2:**
  - ***Equipment Platform (NEW)***
  - ~~Height Story~~
  - ~~Industrial Equipment Platform~~
  - ~~Story~~ ***(ALL DELETED)***

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Height and Area Limits – Construction Type

Section 503 IBC - Partial Table 503

		TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
	HEIGHT (feet)	UL	160	65	55	65	55	65	50	40
GROUP	STORIES(S) AREA (A)									
A-1	S	UL	5	3	2	3	2	3	2	1
	A	UL	UL	15,500	8,500	14,000	8,500	15,000	11,500	5,500
A-2	S	UL	11	3	2	3	2	3	2	1
	A	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
A-3	S	UL	11	3	2	3	2	3	2	1
	A	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
A-4	S	UL	11	3	2	3	2	3	2	1
	A	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
A-5	S	UL	UL	UL	UL	UL	UL	UL	UL	UL
	A	UL	UL	UL	UL	UL	UL	UL	UL	UL
B	S	UL	11	5	3	5	3	5	3	2
	A	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000
E	S	UL	5	3	2	3	2	3	1	1
	A	UL	UL	26,500	14,500	23,500	14,500	25,500	18,500	9,500
F-1	S	UL	11	4	2	3	2	4	2	1
	A	UL	UL	25,000	15,500	19,000	12,000	33,500	14,000	8,500
F-2	S	UL	11	5	3	4	3	5	3	2
	A	UL	UL	37,500	23,000	28,500	18,000	50,500	21,000	13,000
H-1	S	1	1	1	1	1	1	1	1	NP
	A	21,000	16,500	11,000	7,000	9,500	7,000	10,500	7,500	NP
H-2[d]	S	UL	3	2	1	2	1	2	1	1
	A	21,000	16,500	11,000	7,000	9,500	7,000	10,500	7,500	3,000
H-3[d]	S	UL	6	4	2	4	2	4	2	1
	A	UL	60,000	26,500	14,000	17,500	13,000	25,500	10,000	5,000
H-4	S	UL	7	5	3	5	3	5	3	2
	A	UL	UL	37,500	17,500	28,500	17,500	36,000	18,000	6,500
H-5	S	4	4	3	3	3	3	3	3	2
	A	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000

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ICC Plan Review Record

Section 506 (new)

GENERAL BUILDING LIMITATIONS (Chapters 5 & 6)

_____ Address identification *(501.2)*

Apply Case 1 to determine the allowable height and area and permitted types of construction for a building containing a single occupancy or nonseparated mixed occupancies. Apply Case 2 to determine the allowable height and area and permitted types of construction for a building containing separated mixed occupancies.

AREA MODIFICATIONS TO TABLE 503

Allowable tabular area, A_t *(Table 503)* _____ 1

Area Increase Factor due to frontage, I_f *(506.2)* _____ +

Area Increase Factor due to automatic sprinklers, I_s *(506.3)* _____ +

Conversion factor _____ =

Frontage *(506.2)* _____ *North* _____ *East* _____ *South* _____ *West*

Total Frontage *(F)*_____ft. Perimeter *(P)* _____ft.

Width of open space *(W)* = _____

Area Increase Factor due to frontage, I_f, _____ *(506.2)*

$$I_f = \left[\frac{F}{P} - 0.25\right]\frac{W}{30}$$

CASE 1 — SINGLE OCCUPANCY OR NONSEPARATED MIXED OCCUPANCIES (508.3)

Using Table 503, identify the allowable height and area of the single occupancy or the most restrictive of the nonseparated mixed occupancies. Construction types that provide an allowable tabular area equal to or greater than the adjusted building area and allowable heights (as modified by Section 504) equal to or greater than the actual building height are permitted.

DETERMINE CONSTRUCTION TYPE

Actual building area _____ft^2

Adjusted building area _____ft^2
actual building area ÷ conversion factor

Actual building height _____ feet _____stories

Allowable building height _____ feet _____stories

Permitted types of construction _____

Type of construction assumed for review *(602.1)* _____

CHECK ALLOWABLE AREA (506.4)

Allowable area per floor *(A_a)*

_____ × _____ = _____ft^2
conversion factor tabular area *(Table 503)*

Total floor area (all stories) _____ft^2

Allowable floor area (all stories)

_____ × _____ = _____ft^2
Allowable area per floor *(A)* number of stories (maximum 3)

Compliance verified _____

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Unlimited Area Buildings

Section 507

- *507.1 General section added (Section #'s off) (NEW)*
  - *Requires detemination of open space around building*
- *507.6 Group A-3 buildings of Type II Construction (Original Section Split)*
- *507.7 Group A-3 buildings of Type III & IV Construction (Original Section Split)*
  - *Many additional specific limitations*

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Mixed Use & Occupancy

Section 508

- *508.2 Accessory Occupancies*
  - *508.2.4.1 to Assembly Areas (CT)*
- *508.3 Non-Separated Occupancies*
- *508.4 Separated Occupancies*

- ~~*508.5 Group R-2 IIIA*~~
- ~~*508.6 Group R-2 Type IIA*~~ *DELETED*
- ~~*508.7 Open parking garage*~~

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Incidental Uses

Section 509 IBC (NEW)

- *509.2 Occupancy Classification*
- *509.3 Area limitations*
- *509.4 Separation & Protection (Table 509.4)*

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Special Provisions

Section 510 IBC (bumped)

- *510.2 Horizontal building separation allowance*
- *510.3 Group S-2 (open above enclosed)*
- *510.4 Parking beneath Group R*
- *510.5 Group R-1 & R-2 Type IIIA*
- *510.6 Group R-1 & R-2 Type IIA*
- *510.7 Open parking garage beneath Groups A,I,B, M &R*
- *510.8 Group B or M with Group S-2 Open Parking Garage*
- *510.9 Multiple buildings above a horizontal assembly (NEW)*

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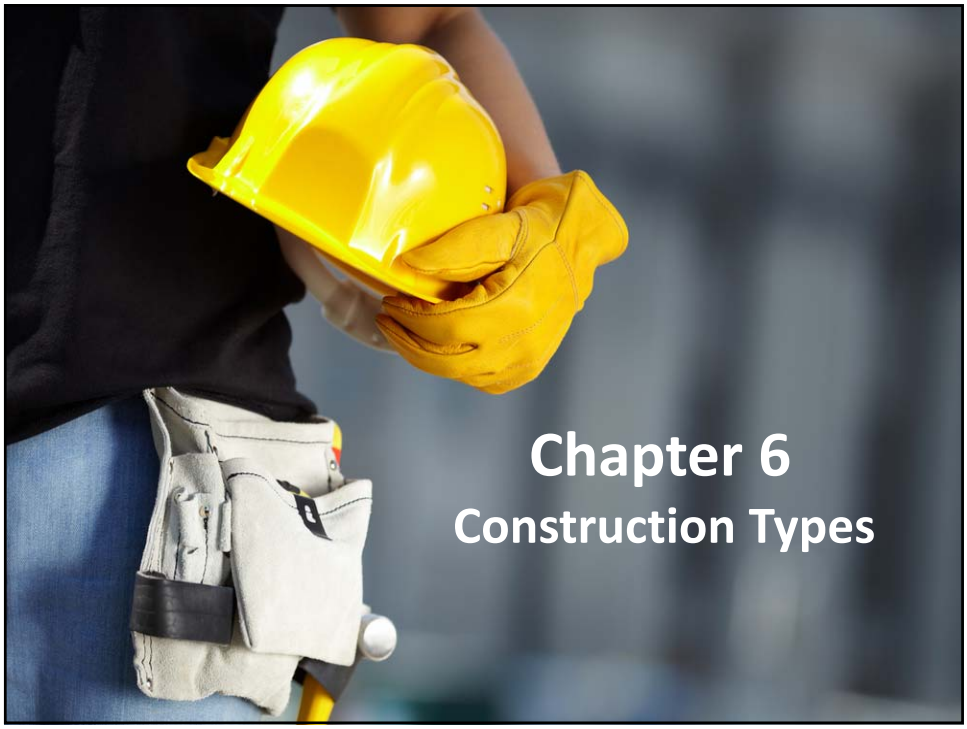

Construction Types - Review

Section 601 IBC

- Five (5) main construction types unchanged
  - Type I - Noncombustible
  - Type II - Noncombustible
  - Type III - Combustible Interior, Noncombustible Exterior
  - Type IV - Heavy Timber
  - Type V - Combustible
- Types IA and IB are fire resistance rated
- Types II, III, and V have Type A (protected) and Type B (unprotected)

AKF

Fire-Resistance Rating Requirements

Section 601 IBC

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[d]	B	A[d]	B	HT	A[d]	B
Primary structural frame[g] (see Section 202)	3[a]	2[a]	1	0	1	0	HT	1	0
Bearing Walls									
Exterior[f,g]	3	2	1	0	2	2	2	1	0
Interior	3[a]	2[a]	1	0	1	0	1/HT	1	0
Nonbearing walls and partitions Exterior	See Table 602								
Nonbearing walls and partitions Interior[e]	0	0	0	0	0	0	See Section 602.4.6	0	0
Floor construction and secondary members (see Section 202)	2	2	1	0	1	0	HT	1	0
Roof construction and 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

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Type I & II Construction

Table 601 Fire-Resistance Rating Requirements For Building Elements (Hrs)

BUILDING ELEMENT	TYPE I		TYPE II	
	A	B	A[d]	B
Primary structural frame[g] (see Section 202)	3[a]	2[a]	1	0
Bearing Walls				
Exterior[f,g]	3	2	1	0
Interior	3[a]	2[a]	1	0
Nonbearing walls and partitions Exterior				
Nonbearing walls and partitions Interior[e]	0	0	0	0
Floor construction and secondary members (see Section 202)	2	2	1	0
Roof construction and secondary members (see Section 202)	$1^1/_2$[b]	1[b,c]	1[b,c]	0[c]

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Type III Construction

- Exterior walls are of non-combustible materials
- Interior walls are permitted to be of any material approved by the code
  - III A has interior fire ratings; III B has none
- Fire-retardant-treated wood can be used for exterior wall assemblies of two (2) hour rating or less

Table 601: Fire Resistance Rating for Building Elements

BUILDING ELEMENT	TYPE III	
	A[d]	B
Primary structural frame (see Section 202)	1	0
Bearing walls		
Exterior	2	2
Interior	1	0
Nonbearing walls and partitions Exterior	See Table 602	
Nonbearing walls and partitions Interior	0	0
Floor construction and secondary members (see Section 202)	1	0
Roof construction and secondary members (see Section 202)	1b, c	0

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Type IV Construction

- Exterior walls are of noncombustible materials
- Interior elements are of solid or laminated wood w/o concealed spaces
- Fire-retardant-treated wood is permitted in exterior wall assemblies of two (2) hour rating or less

Table 601: Fire Resistance Rating for Building Elements

BUILDING ELEMENT	TYPE IV
	HT
Primary structural frame (see Section 202)	HT
Bearing walls	
Exterior	2
Interior	1/HT
Nonbearing walls and partitions Exterior	See Table 602
Nonbearing walls and partitions Interior	See Section 602.4.6
Floor construction and secondary members (see Section 202)	HT
Roof construction and secondary members (see Section 202)	HT

Table 602.4 (NEW) Wood Member Size

MINIMUM NOMINAL SOLID SAWN SIZE		MINIMUM GLUED-LAMINATED NET SIZE	
Width, inch	Depth, inch	Width, inch	Depth, inch
8	8	6 3/4	8 1/4
6	10	5	10 1/2
6	8	5	8 1/4
6	6	5	6
4	6	3	6 7/8

AKF

Type V Construction

- Structural elements, exterior walls, and interior walls are any material permitted by the code
- Type VA has a 1 hour fire protection rating
- Type VB has **no** interior ire protection rating

Table 601: Fire Resistance Rating for Building Elements

BUILDING ELEMENT	TYPE V	
	A	B
Primary structural frame (see Section 202)	1	0
Bearing walls Exterior Interior	 1 1	 0 0
Nonbearing walls and partitions Exterior	See Table 602	
Nonbearing walls and partitions Interior	0	0
Floor construction and secondary members (see Section 202)	1	0
Roof construction and secondary members (see Section 202)	1	0

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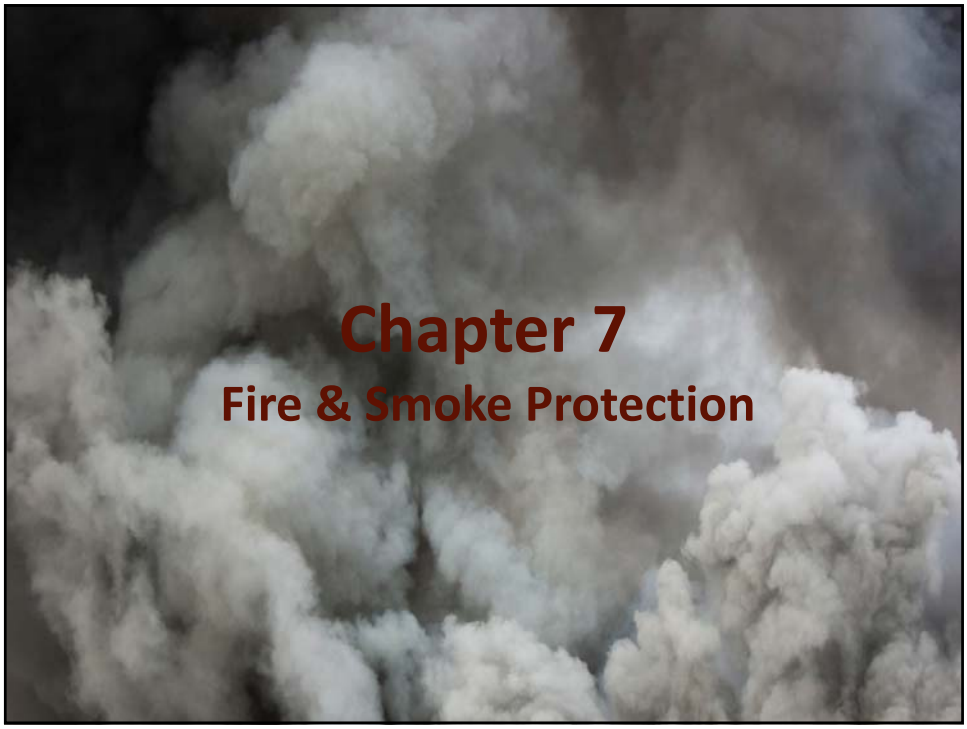
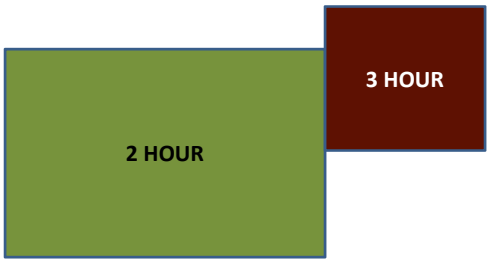
BREAK



Chapter 7 – Fire & Smoke Protection

Section 701.2 Multiple Use Fire Assemblies

- Multiple purpose fire assemblies must comply with requirements for each adjoining use fire assembly.
- ***For example****: Some building elements are required by two or more different code provisions to be fire-resistance rated.*



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Chapter 7 – Fire & Smoke Protection

Section 703.4 Automatic Sprinklers

- Sprinklers SHALL not used to establish fire-resistance rating.

Section 703.7 Marking & Identification

- Label fire walls/barriers/partitions, smoke barriers/partitions
- Permanent marking above ceilings.
- Located within 15ft of the end of each wall at intervals ≤ 30ft.
- Include lettering ≥ 3inches in height.

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Chapter 7 – Fire & Smoke Protection

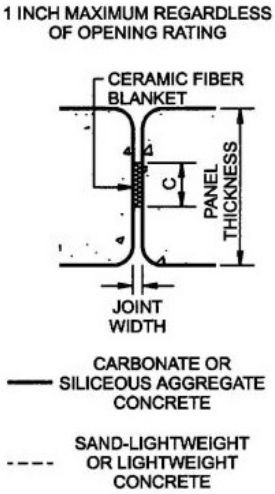
Section 704.6 Attachments to Structural Members

- Attachments to structural members must extend to 1 inch of the surface of the fire protection.

Connections

Section 704.6.1 ADD CT Amendment

- *Limited protection for non-fire-resistance rated members*
  - *Non-rated members shall be protected in same manner as rated members for a distance ≥ 12 inches from point of connection.*



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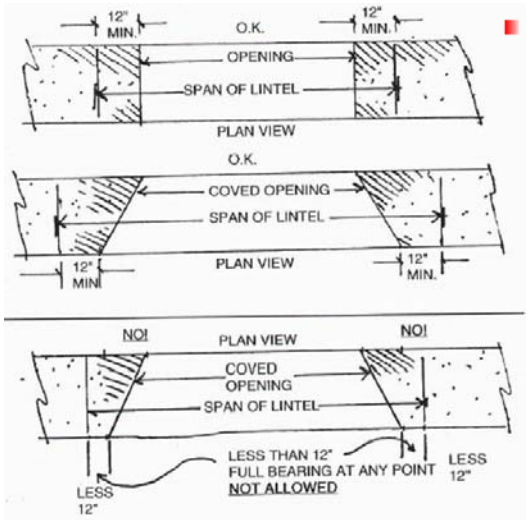
Chapter 7 Fire & Smoke Protection

Section704.11 Bottom Flange Protection



- The bottom flanges < 6ft long are not required to be protected even if part of the primary structural frame.
  - Regardless of the span.

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Chapter 7 – Fire and Smoke Protection

Section 705.2 Combustible Projections

- Projections into separation distances
- Structural stability

TABLE 705.2 MINIMUM DISTANCE OF PROJECTION

FIRE SEPARATION DISTANCE (FSD)	MINIMUM DISTANCE FROM LINE USED TO DETERMINE FSD
0 feet to less than 2 feet	Projections not permitted
2 feet to less than 5 feet	24 inches
5 feet or greater	40 inches

For SI: 1 foot = 304.8 mm; 1 inch = 25.4 mm.

Section 603.1 Fire-Retardant-Treated Wood

- Permitted:
  - Nonbearing partitions w/ fire-resistance rating 2 hours or less.
  - Nonbearing exterior walls where fire-resistance rated construction is not required.
  - Roof construction

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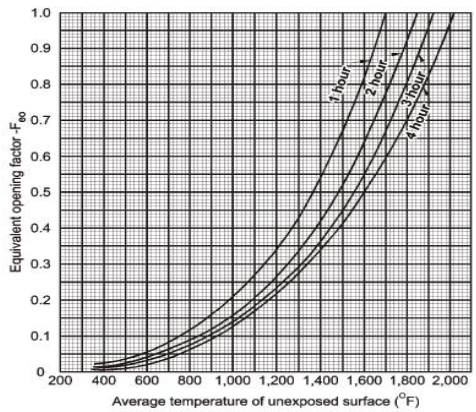
Chapter 7 – Fire and Smoke Protection

Section 705.7 Equivalent Opening Factor-Unexposed Surface Temperature

- Radiant flux limitations on exposed materials.
- $A_c = A + (A_t \times F_{eo})$



For SI: °C = [(°F) - 32] / 1.8.

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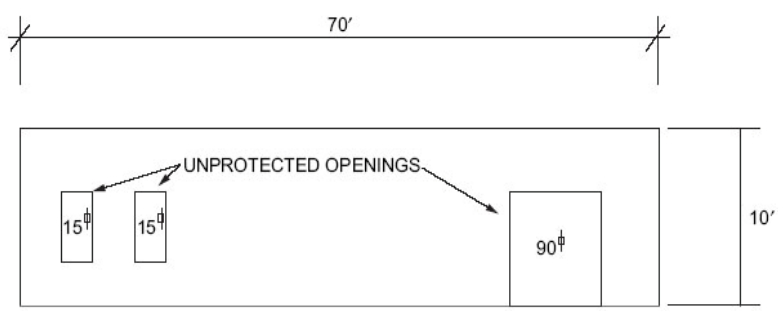
Chapter 7 – Fire and Smoke Protection

Section 705.7 Elevation of Exterior Wall- Unexposed Surface Temperature



For SI: 1 foot = 304.8 mm.
Total Wall Area = 700sf

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Chapter 7 – Fire and Smoke Protection

Section 706.1 CT Amendments – Fire Walls

- *Portions of buildings separated by one or more fire walls shall be considered separate buildings.*
- *Specific wall assemblies must comply with requirements.*

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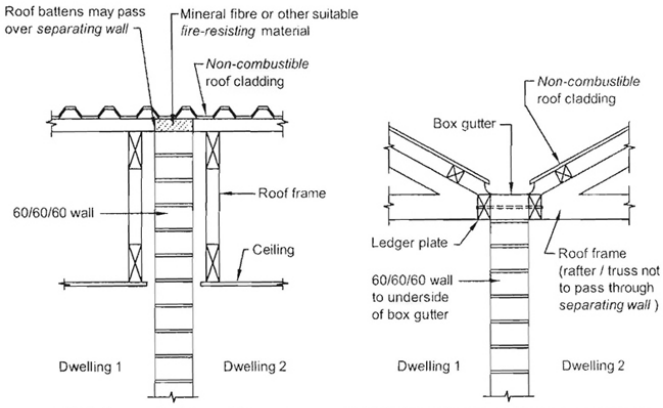
Chapter 7 – Fire and Smoke Protection

Section 706.6 Vertical Continuity

- Fire wall terminations above sloped roofs
- Continuous from the foundation to or through the roof
- Min 30inches above both adjacent roofs



(a) Wall parallel to roof frame (b) Wall at right-angles to roof frame

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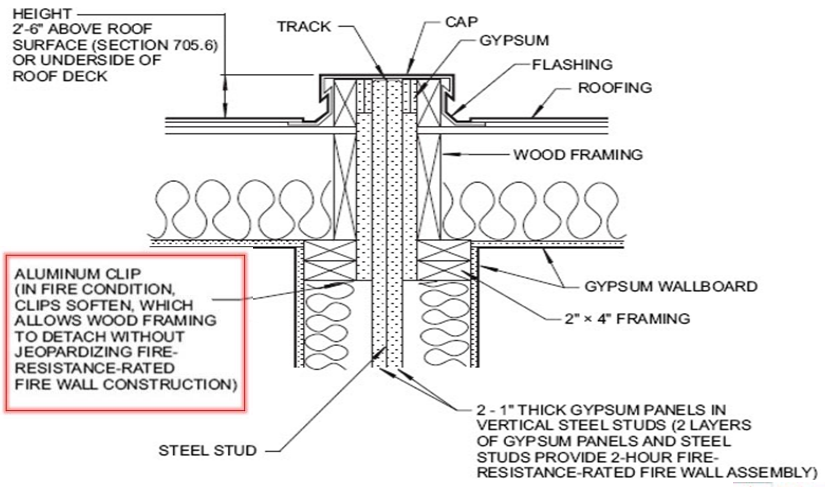
Chapter 7 – Fire and Smoke Protection

Figure 706.6 Generic Fire Wall Example – Vertical Continuity



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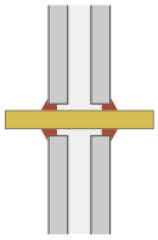
Chapter 7 – Fire and Smoke Barriers

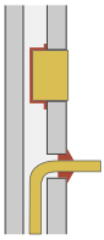
Section 707 Fire Barriers

- Construction
- 707.6 Openings
  - Max aggregate width 25% of the length of wall
  - Max area of an opening ≤ 156sf
- 707.7 Penetrations Must comply with section 714

Through Penetration



Membrane Penetration



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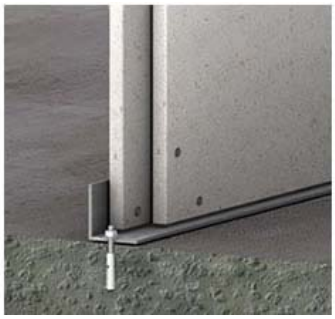
Chapter 7 – Fire and Smoke Protection

Section 708.5 Exterior Fire Separation Walls – Fire Partitions

- Comply with Section 705 exterior walls.
  - Separation distance requirements shall not apply.
- Exceptions:
  - 1022.7 Exterior egress balconies
  - 102.6.6 Interior exit stairways & ramps



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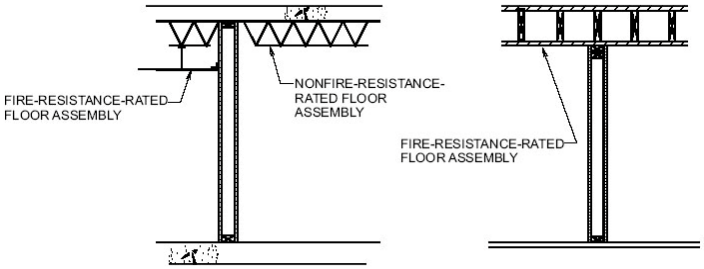
Chapter 7 – Fire and Smoke Protection

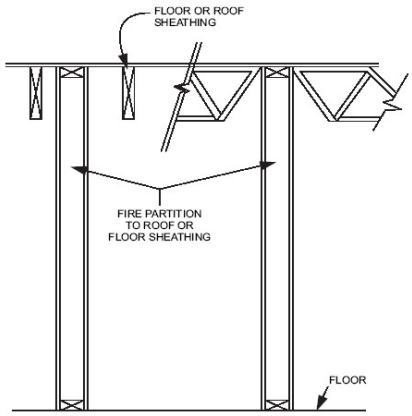
Section 709.4 Continuity – Smoke Barriers

- Continuous effective membrane
- Supporting construction protected
- Smoke barrier continuity exceptions:
- Interstitial spaces
- Elevator lobbies
- Areas of refuge



Chapter 7 – Fire and Smoke Protection

Tables 709.4 Continuity – Smoke Barriers



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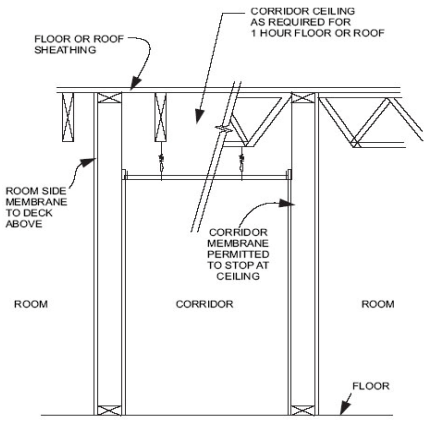

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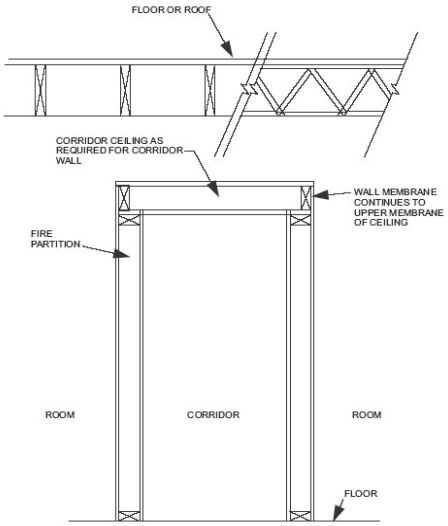
Chapter 7 – Fire and Smoke Protection

Tables 709.4 Continuity – Smoke Barriers



708.4 EXCEPTION 3
(C)

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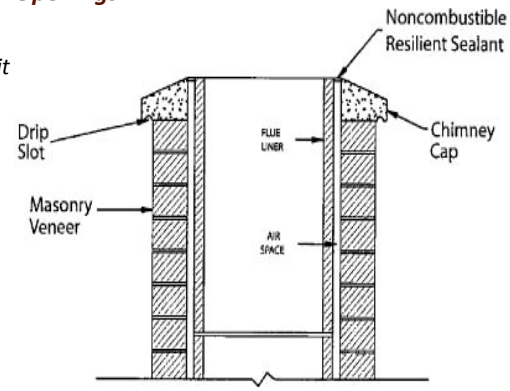
Chapter 7 – Fire and Smoke Protection

Section 712.1 AMD – Vertical Openings

- *712.1.1 Shaft enclosures*
- *712.1.2 Individual dwelling unit*
- *712.1.3 Escalator openings*
- *712.1.4 Penetrations*
- *712.1.5 Ducts*
- *712.1.6 Atriums*
- *712.1.7 Masonry chimney*
- ***712.1.8 Two-story openings***
- *712.1.9 Parking garages*
- *712.1.10 Mezzanine*
- *712.1.11 Joints*
- ***712.1.13 Floor fire doors***
- ***712.1.14 Group I-3***
- ***712.1.15 Elevators in parking garages***
- ***712.1.16 Duct systems in parking garages***
- *712.1.17 Non-fire-resistance-rated joints*
- *712.1.18 Openings otherwise permitted*



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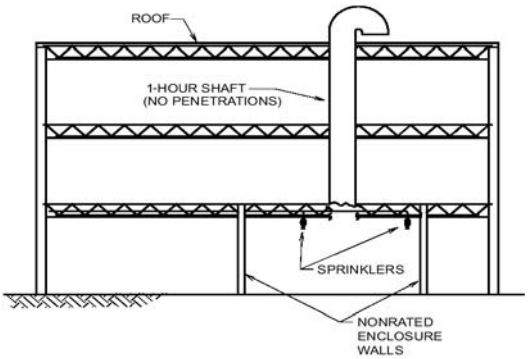
Chapter 7 – Fire and Smoke Protection

Section 713.1 NEW – Shaft Enclosures

- *Openings through a floor/ceiling assembly shall be protected by A shaft enclosure.*

Section 713.2 NEW Construction

- *Shaft enclosures constructed as fire barriers or horizontal assemblies, or both.*



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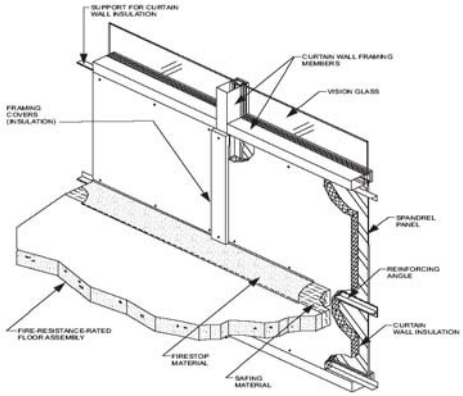
Fire-Resistant Joint System

Section 715 Fire – Resistant Joint System

Section 715.4 Exterior Curtain Wall/Floor Intersection

- Void between a floor & curtain wall requires sealing to prevent the spread of flames and products of combustion between adjacent stories.



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Fire-Resistant Joint System

Section 715.4 Exterior Curtain Wall/Floor Intersection

TABLE 705.8 MAXIMUM AREA OF EXTERIOR WALL OPENINGS BASED ON FIRE SEPARATION DISTANCE AND DEGREE OF OPENING PROTECTION

FIRE SEPARATION DISTANCE (feet)	DEGREE OF OPENING PROTECTION	ALLOWABLE AREA[a]
0 to less than 3[b, c]	Unprotected, Nonsprinklered (UP, NS)	Not Permitted
	Unprotected, Sprinklered (UP, S)[i]	Not Permitted
	Protected (P)	Not Permitted
3 to less than 5[d, e]	Unprotected, Nonsprinklered (UP, NS)	Not Permitted
	Unprotected, Sprinklered (UP, S)[i]	15%
	Protected (P)	15%
5 to less than 10[e, f]	Unprotected, Nonsprinklered (UP, NS)	10%[h]
	Unprotected, Sprinklered (UP, S)[i]	25%
	Protected (P)	25%
10 to less than 15[e, f, g]	Unprotected, Nonsprinklered (UP, NS)	15%[h]
	Unprotected, Sprinklered (UP, S)[i]	45%
	Protected (P)	45%
15 to less than 20[f, g]	Unprotected, Nonsprinklered (UP, NS)	25%
	Unprotected, Sprinklered (UP, S)[i]	75%
	Protected (P)	75%
20 to less than 25[f, g]	Unprotected, Nonsprinklered (UP, NS)	45%
	Unprotected, Sprinklered (UP, S)[i]	No Limit
	Protected (P)	No Limit
25 to less than 30[f, g]	Unprotected, Nonsprinklered (UP, NS)	70%
	Unprotected, Sprinklered (UP, S)[i]	No Limit
	Protected (P)	No Limit
30 or greater	Unprotected, Nonsprinklered (UP, NS)	No Limit
	Unprotected, Sprinklered (UP, S)[i]	Not Required
	Protected (P)	Not Required

For SI: 1 foot = 304.8 mm.

Chapter 7 – Fire and Smoke Protection

Section 716.3.1 Fire & Smoke Dampers – Opening Protectives

- Protect openings created by duct penetrations and transfer openings assemblies required to be protected.
- Complying with **hose stream** requirements **(H)** permitted in applications.
- Complying with **temperature rise** requirements (T).
- **Ratings (XXX)** that **exceed** the ratings required- are permitted.

TABLE 716.3 MARKING FIRE-RATED GLAZING ASSEMBLIES

FIRE TEST STANDARD	MARKING	DEFINITION OF MARKING
ASTM E 119 or UL 263	W	Meets wall assembly criteria.
NFPA 257 or UL 9	OH	Meets fire window assembly criteria including the hose stream test.
NFPA 252 or UL 10B or UL 10C	D H T	Meets fire door assembly criteria. Meets fire door assembly "Hose Stream" test. Meets 450ºF temperature rise criteria for 30 minutes
	XXX	The time in minutes of the fire resistance or fire protection rating of the glazing assembly

For SI: ºC = [(ºF) - 32]/1.8.

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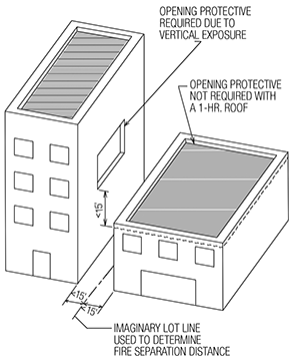
Chapter 7 – Fire and Smoke Protection

Section 716.4 Fire Protection Ratings Alternatives – Opening Protectives

- Designs documented in *approved* sources.
- Calculations performed in an *approved* manner.
- Engineering analysis based on a comparison of opening protective designs having *fire protection ratings* as determined by the test procedures set forth in NFPA 252, NFPA 257 or UL 9.
- Alternative protection methods as allowed by Section 104.11



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Chapter 7 – Fire and Smoke Protection

Section 716.5 Opening Fire Protection Assemblies-Opening Protectives (Partial Table)

TABLE 716.5 OPENING FIRE PROTECTION ASSEMBLIES, RATINGS AND MARKINGS

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANELSIZE	FIRE RATED GLAZING MARKING DOOR VISION PANEL[a]	MINIMUM SIDELIGHT/ TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDELITE/TRANSOM PANEL	
					Fire protection	Fire resistance	Fire protection	Fire resistance
Fire walls and fire barriers having a required fire-resistance rating greater than 1 hour	4	3	Not Permitted	Not Permitted	Not Permitted	4	Not Permitted	W-240
	3	3[a]	Not Permitted	Not Permitted	Not Permitted	3	Not Permitted	W-180
	2	$1^1/_2$	100 sq. in.[c]	≤100 sq.in. = D-H-90 >100 sq.in.= D-H-W-90	Not Permitted	2	Not Permitted	W-120
	$1^1/_2$	$1^1/_2$	100 sq. in.[c]	≤100 sq.in. = D-H-90 >100 sq.in.= D-H-W-90	Not Permitted	$1^1/_2$	Not Permitted	W-90
Shaft, exit enclosures and exit passageway walls	2	$1^1/_2$	100 sq. in.[c, d]	≤100 sq.in. = D-H-90 > 100 sq.in.= D-H-T-or D-H-T-W-90	Not Permitted	2	Not Permitted	W-120
Fire barriers having a required fire-resistance rating of 1 hour: Enclosures for shafts, exit access stairways, exit access ramps, interior exit stairways, interior exit ramps and exit passageway walls	1	1	100 sq. in.[c, d]	≤100 sq.in. = D-H-60 >100 sq.in.= D-H-T-60 or D-H-T-W-60	Not Permitted	1	Not Permitted	W-60
					Fire protection			
Other fire barriers	1	$^3/_4$	Maximum size tested	D-H-NT-45	$^3/_4$		D-H-NT-45	
Fire partitions: Corridor walls	1	$^1/_3$[b]	Maximum size tested	D-20	$^3/_4$[b]		D-H-OH-45	
	0.5	$^1/_3$[b]	Maximum size tested	D-20	$^1/_3$		D-H-OH-20	
Other fire partitions	1	$^3/_4$	Maximum size tested	D-H-45	$^3/_4$		D-H-45	
	0.5	$^1/_3$	Maximum size tested	D-H-20	$^1/_3$		D-H-20	

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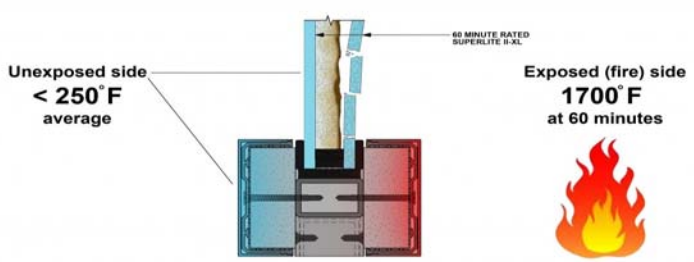
Chapter 7 – Fire and Smoke Protection

Opening Protectives

Section 716.5.5.1 Glazing in Doors

- Fire-protection-rated glazing in excess of 100 square inches is not permitted.
- Fire-resistance rated glazing in 100 square inches shall be permitted in fire door assemblies when tested as components of the door assemblies



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Chapter 7 – Fire and Smoke Protection

Thermal - & Sound – Insulating Materials

Section 720.1.1 CT Amendments <u>Urea-formaldehyde Insulation</u>

- Urea-formaldehyde foamed-in-place insulation shall not be installed in any building or structure on or after June 1, 1981.

(29-277 CGS)

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Chapter 7 – Fire and Smoke Protection

Section 722 Materials- Calculated Fire Resistance

TABLE 722.2.1.2(1) VALUES OF $R_n^{0.59}$ FOR USE IN EQUATION 7-4

TYPE OF MATERIAL	THICKNESS OF MATERIAL (inches)											
	$1^1/_2$	2	$2^1/_2$	3	$3^1/_2$	4	$4^1/_2$	5	$5^1/_2$	6	$6^1/_2$	7
Siliceous aggregate concrete	5.3	6.5	8.1	9.5	11.3	13.0	14.9	16.9	18.8	20.7	22.8	25.1
Carbonate aggregate concrete	5.5	7.1	8.9	10.4	12.0	14.0	16.2	18.1	20.3	21.9	24.7	27.2[c]
Sand-lightweight concrete	6.5	8.2	10.5	12.8	15.5	18.1	20.7	23.3	26.0[c]	Note c	Note c	Note c
Lightweight concrete	6.6	8.8	11.2	13.7	16.5	19.1	21.9	24.7	27.8 [c]	Note c	Note c	Note c
Insulating concrete[a]	9.3	13.3	16.6	18.3	23.1	26.5[c]	Note c	Note c	Note c	Note c	Note c	Note c
Airspace[b]	—	—	—	—	—	—	—	—	—	—	—	—

For SI: 1 inch = 25.4 mm, 1 pound per cubic foot = 16.02 kg/m^3.
a. Dry unit weight of 35 pcf or less and consisting of cellular, perlite or vermiculite concrete.
b. The $R_n^{0.59}$ value for one $^1/_2$" to $3^1/_2$" airspace is 3.3. The $R_n^{0.59}$ value for two $^1/_2$" to $3^1/_2$" airspaces is 6.7.
c. The fire-resistance rating for this thickness exceeds 4 hours.

TABLE 722.2.1.2(2) FIRE-RESISTANCE RATINGS BASED ON $R^{0.59}$

R^a, MINUTES	$R^{0.59}$
60	11.20
120	16.85
180	21.41
240	25.37

a. Based on Equation 7-4.

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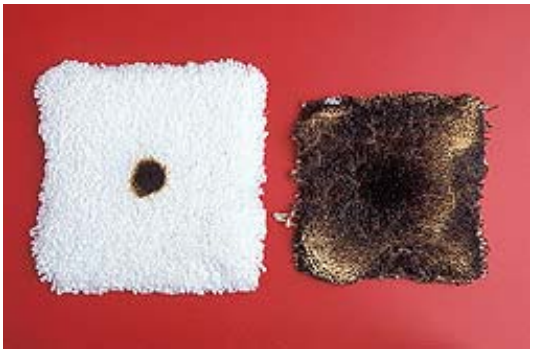
Interior Floor Finish

Section 804.4 Requirements - Class I or II materials

- Classified in accordance with NFPA 253-11
  - Indicate interior floor finish/ classification
- Floor Coverings: "Pill Test" per ASTM D 2859-06
- Minimum critical radiant flux required: MOE components



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Interior Floor Finish

Section 804.4.2 Minimum Critical Radiant Flux

- Groups I-1, I-2 & I-3;
  - Not less than Class I
- Groups A, B, E, H, I-4, M, R-1, R-2, S;
  - Not less than Class II

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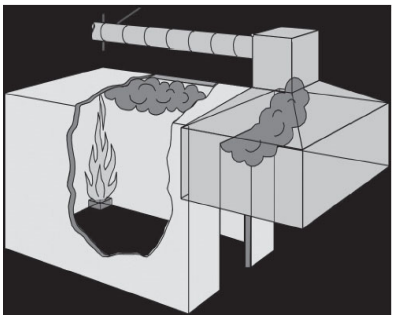
Interior Decorative Finishes

Section 806.5 Interior Trim



- Material shall have minimum Class C flame spread & smoke-development index when tested.
  Exception: foam plastic used as interior trim.
- Combustible trim, excluding handrails & guard rails, shall be ≤ 10% of the wall <u>or</u> ceiling area where attached.
- Corner test for textiles/vinyl (803.1.3) using NFPA 265

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Interior Decorative Finishes

Section 806.6 Interior Floor-Wall Base

- If ≤ 6 inches in height it shall be ≥ Class II when tested in accordance with Section 804.2.
  - Where a Class I floor finish is required, the floor wall base shall also be Class I.

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Chapter 9
Fire Protection
Suppression & Notification

Pump and Riser Room Size

Section 901.8 IBC (NEW) Physical requirements

- Physical sizes / working clearances for pump rooms and sprinkler systems
- Clearances (doorways and unobstructed passageways) to remove largest pieces of stationary equipment

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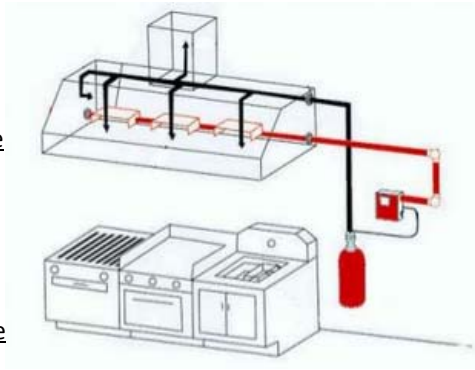
Alternative Protection

Section 903.1.1 CT Amendments

- In any occupancy where the character of fuel for fire is such that extinguishment or control of fire is accomplished by a type of alternative automatic extinguishing system complying with Section 904 in lieu of an automatic sprinkler system, such alternative system shall be installed in accordance with the applicable standard and approved by the code official.



AKF

Use Group A-2

Section 903.2.1.2 – Assembly - CT Amendments

- Automatic sprinkler system shall be provided for Group A-2 occupancies where:
- The fire area > 5,000 sf
  - ***Exception: Existing restaurants in existing non-sprinklered buildings with a fire area ≤ 12,000 sf previously designated as A-3 or undergoing an addition, alteration , or change in occupancy increasing original fire area***
- **Fire area in dance halls, discotheques, nightclubs, or Assembly uses with festival seating and an occupant load of ~~300~~ *100* or more**.
- Fire area is located on a floor other than the level of exit discharge.

AKF

Use Group F-1

Section 903.2.4 IBC Amendments

- **12,000 sf fire area reduced to 2,500 sf where upholstered furniture/ mattresses are fabricated**

AKF

Use Group I Suppression

903.2.6 (AMD) Buildings with I-Use Occupancies

Exceptions:

- I-1 facilities per 903.3.1.2
- Day Care facilities located at the level of exit discharge
- Portions of other uses located on floors above the Day Care use when all levels below are suppressed, other than open parking garage uses

Use Group M

Section 903.2.7 Mercantile - CT Amendments

- Automatic sprinkler system provided ~~in~~ ***throughout*** ***buildings*** containing Group M occupancies where:
  - The Group M fire area > 12,000sf
  - Fire area is located > 3 stories above grade ***plane***
  - The combined area of all Group M fire areas on all floors, including any mezzanines, exceeds 24,000 square feet

- ***Throughout stories below the level of exit discharge exceeding 2,500sf with an area are used for the sale, storage or handling of combustible goods or merchandise.***
- Any Group M occupancy > 5,000sf display or sales of upholstered furniture or mattresses

AKF

Use Group R

Section 903.2.8 – Residential CT Amendments

- Automatic sprinkler system shall be provided ***throughout all newly constructed buildings*** with a Group R fire area **or in existing buildings with a change of occupancy or addition**
- **Exceptions:**
  - **Group R-1 bed and breakfast**
  - **Existing R-3 renovated buildings > 4 stories with a change of occupancy to ≤ four dwelling units (R2; 3 conditions)**
  - **Existing building conversions: R3 to R2 (before 6/15/94)**
  - **Units added horizontally, provided addition is sprinkled and a 1-hour fire separation is provided**

AKF

Use Group R Suppression

(AMD) 903.3.1.1.2 CT Amendments from 2015 IBC

- **Buildings of Group R ≤ 3 ~~(4)~~ stories above grade and 60 ft in height, shall have automatic sprinkler systems installed.**
- **Buildings other than Group R shall not be permitted to utilize an NFPA 13R sprinkler system.**
  - **Exception: Buildings that comply with Section 510.2**

AKF

Specific Building Areas and Hazards

903.2.11.6 IBC – Additional Required Systems;
903.2.11.7 – CT Statutory Requirements

[F] TABLE 903.2.11.6 ADDITIONAL REQUIRED SUPPRESSION SYSTEMS

SECTION	SUBJECT
402.10	Covered and open mall buildings
403.3	High-rise buildings
404.3	Atriums
405.3	Underground structures
407.6	Group I-2
410.7	Stages
411.4	Special amusement buildings
412.4.6, 412.4.6.1, 412.6.5	Aircraft hangars
415.10.11	Group H-5 HPM exhaust ducts
416.5	Flammable finishes
417.4	Drying rooms
507	Unlimited area buildings
509.4	Incidental uses
1028.6.2.3	Smoke-protected assembly seating
IFC	Sprinkler system requirements as set forth in Section 903.2.11.6 of the *International Fire Code*

- C.G.S. 29-315
  - "Automatic fire extinguishing systems shall be installed in any building or structure to be built more than 4 stories tall and used for human occupancy, and in other occupancies as required by the State Fire Marshal in the interest of safety because of special occupancy hazards."

AKF

Vertical Openings

(ADD) Section 903.3.1.1.2 CT Amendments

- **Closely spaced sprinklers and draft stops are not required around floor openings permitted to be unenclosed by this code unless the closely spaced sprinklers & draft stops are being utilized in lieu of an enclosure as specified by Section 712.1.3.1.**

AKF

Fire Protection – Domestic Service Systems

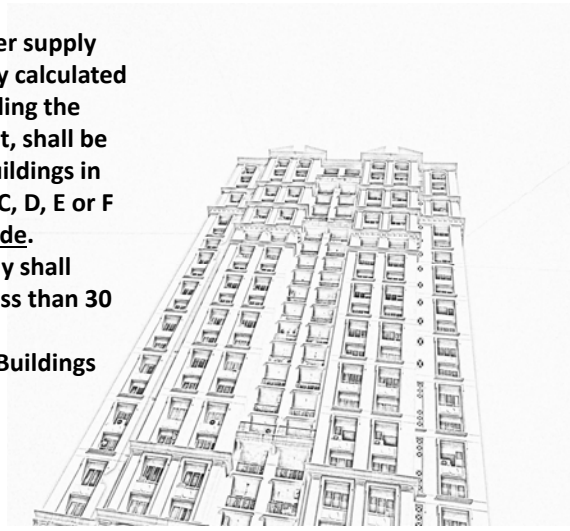
Section 903.3.5.1.3 CT (ADD) Water Authority Approval

- **Unless served by a private well of sufficient capacity or other approved source, domestic service shall be permitted to provide the water supply for the automatic sprinkler system only upon written approval of the water authority supplying such domestic service**

Secondary Water Supply

Section 903.3.5.2 CT Amendments – High-Rise Buildings

- **A secondary on-site water supply equal to the hydraulically calculated sprinkler demand, including the hose stream requirement, shall be provided for high-rise buildings in Seismic design category C, D, E or F as determined by this code.**
  A secondary water supply shall have a duration of not less than 30 min.
  - **Exception: Existing Buildings**



Piping Design - Standpipes

905.2.1 CT IFC/IBC Coordination

- Riser, supply and water service piping shall be sized to maintain residual pressure of ≥ 100 psi at the topmost outlet of each riser while flowing minimum specified water quantities based upon an available pressure of 150 psi at the service connection
- Exception: In buildings equipped throughout with an automatic sprinkler system per 903.3.1.1 or 903.3.1.2, and where the highest floor level is not more than 150 ft. above the lowest level of fire department access, Class I standpipes shall have an automatic or manual-wet supply.

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Portable Fire Extinguishers

Section 906 CT Amendments

- **(AMD) 906.1 As required by the CT Fire Prevention Code**
- **(NEW) 906.1.1 Group R-1 B&B. Portable fire extinguishers required in kitchens; selected and installed per NFPA 10.**
- **Alternate compliance:**
  - **Listed residential range-top unit**
  - **Commercial range hood with listed suppression system**
- **(DEL) 906.3 through 906.10 *(IFC)***

AKF

Fire Alarm & Detection Systems

Section 907

- Fire sprinklers and other suppressions systems/devices
- Emergency notification alarms

Detection and Notification

Section 907 IBC Amendments –

- 907.2.7.1 (CT) Occupant notification
- 907.2.9.1 Manual fire alarms
- 907.2.9.3 Colleges/universities
- 907.8.2.10 R-4 Fire Alarms IBC

Detection and Notification

Section 907 CT Amendments –

- ***907.2.8.2 Automatic F/A systems (B&B-CT Exception 2)***
- ***907.2.11.1.1 R-1 Bed & Breakfast (CT)***
- ***907.5.2.2.6.1 Emergency forces notification (CT)***
- ***907.6.5.1 Automatic telephone-dialing devices: 28-25b, CGS***

Emergency Alarm Systems

Section 908.7– Carbon Monoxide Detectors - CT Amendments

- 908.7.1 CO Detectors in R-1, R-3 & R-4
  - Exception: No fuel-fired contamination
- 908.7.2 Required power source
  - On-grid/off-grid
  - Alterations & Additions
- 908.7.3 Alterations & Additions
  - Exception: Interconnected units
  - Exemptions:
    - Exterior alterations
    - No fuel-fired sources

Smoke Control Panel

Section 909.16 CT Amendments (see Section 911)

Fire Fighter smoke control panel

- **Located in Fire Command center**
- **Used solely for emergency response**
- **In high-rise buildings**
- **In other buildings with smoke-protected assembly seating**

AKF

Smoke Control

Section 909 .21 IBC (NEW) – Elevator Hoistway Pressurization Option

- **Option eliminates elevator lobbies**
- **Tested Shaft pressurization – 0.10 to 0.25 w.g.**
- **Fan system requirements**
- **Emergency standby power source**
- **System activation control & response time**
- **Special inspections for performance**

Fire Code Coordinations

Sections 912-915 IBC (NEW)

- Fire Department Connections
- Fire Pumps
- Emergency Responder Safety Features
- Emergency Responder Radio Coverage

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Fire Department Connections

Section 912 (NEW)

- Locations
- Access
- Connection identifications
- Backflow prevention

AKF

Fire Pumps

Section 913 (NEW)

- Damage protection
- Fire isolation
- Temperature control
- Valve supervision
- Testing

AKF

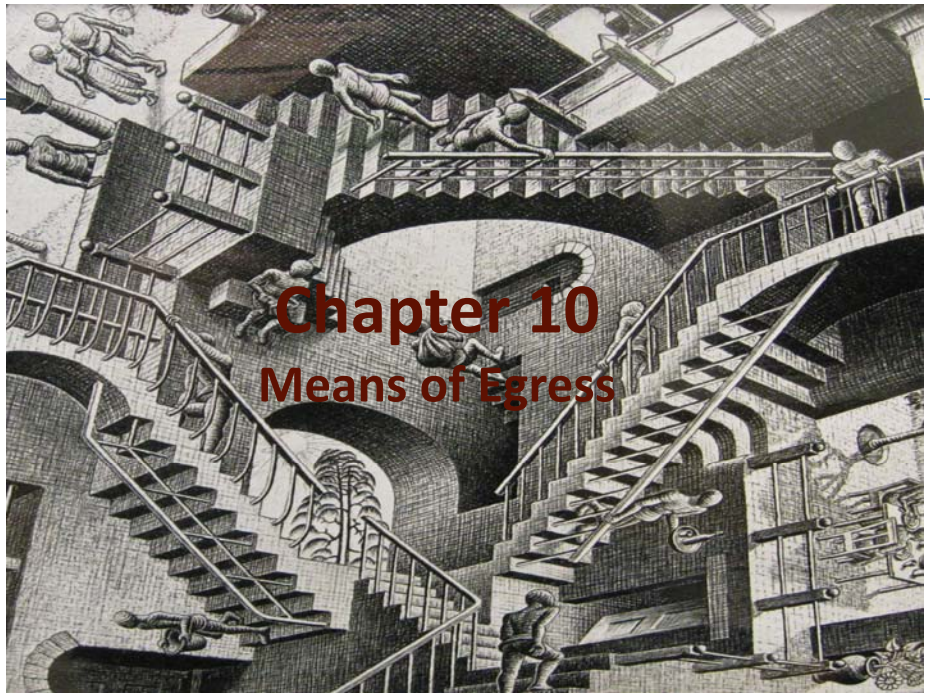
Emergency Responders

Sections 914-915 Safety and Communications (NEW)

Emergency Responder Safety Features
- Shaftway access (interior/exterior)
- Equipment Rooms identified

Emergency Responder Radio Coverage
- (see IFC 510 requirements

AKF



Means of Egress - General

Section 1003 IBC General M.O.E.

- Controls the design, construction, & arrangement of the required means of egress
- Unlawful to alter a building to reduce the number of exits or capacity of the means of egress
- **Headroom 1003.2 adds 3 ceiling height exceptions: mezzanines, ramps, parking garages**

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Means of Egress Physical Characteristics

General M.O.E. 1003 - Continued

- Ceiling height is required to be 7 feet 6 inches minimum
- Protruding objects
- Horizontal projections
- Sloped surfaces
- Means of egress system shall be continuous without obstructions
- Elevators, escalators, moving walkways are not permitted to be used as a portion of the means of egress

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Means of Egress Sizing

Section 1004.1.1 – Table 1004.1.1 Occupant Load Allowances

- Amends areas without fixed seating – includes balconies, mezzanines: determined by F. A./ Occupant
- For areas with fixed seating, see table
  - Actual occupancy #s may be approved by LBO

AKF

Maximum Floor Area Allowances

Table 1004.1.2 (Partial) - Occupant Loads by Use Type

TABLE 1004.1.2 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal Baggage claim Baggage handling Concourse Waiting areas	 20 gross 300 gross 100 gross 15 gross
Assembly Gaming floors (keno, slots, etc.) Exhibit Gallery and Museum	 11 gross 30 net
Assembly with fixed seats	See Section 1004.4
Assembly without fixed seats Concentrated (chairs only-not fixed) Standing space Unconcentrated (tables and chairs)	 7 net 5 net 15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	100 gross
Courtrooms-other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross
Educational Classroom area Shops and other vocational room areas	 20 net 50 net
Exercise rooms	50 gross
Group H-5 Fabrication and manufacturing areas	200 gross

(NEW Uses)

- DayCare
- Malls
- Museums

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Means of Egress Sizing

AMD Section 1005.1 Egress Width by Component, by Occupant Load

- Minimum width of M.O.E.
- **(DEL) Table 1005.1; <u>adds text</u>**
- **Multiple M.O.E. widths**
- **(AMD) Encroachments**
- Doors & handrails shall not decrease the means of egress by > seven (7) inches - **Except when 34-48 inches AFF**
- Non-structural protrusions shall not decrease the means of egress more than 1 ½ inches on each side

AKF

Egress Illumination

1006.2 Emergency Power

- Emergency electrical system power in buildings with two or more exits shall serve:
- Corridors
- Interior exit stairways
- Interior exit ramps
- Exit passageways
- Exterior landings

AKF

Accessible Means of Egress

Section 1007.3 - Accessible Means of Egress

(AMD) Stairway Exceptions:

- stair and handrail widths
- areas of refuge when provided in stairways
- automatic sprinklers

Exterior Areas – Assisted Rescue

1007.7 IBC AMD Alternative Compliance

- Dimensions; refuge size
- Separations;
- Openness
- Stairway access
- Signage

AKF

Egress Passages

Section 1008 - Doors, Gates & Turnstiles

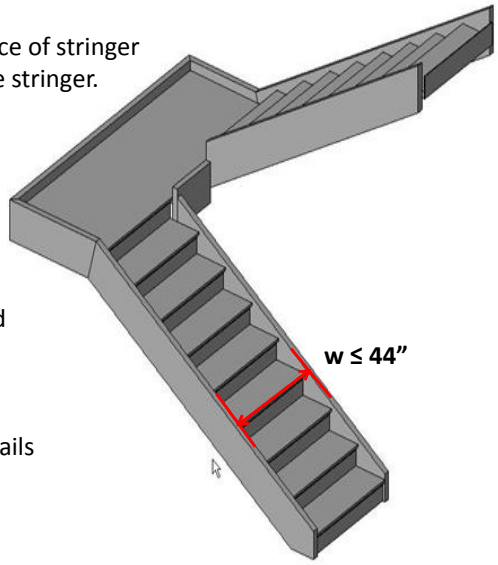
- Min. 32 inches wide, but < 48 inches
- **Group I-2 occupancies used for movement of beds shall have at least 41 ½ inch clear width**
- Stair widths ≥ 44 inches, and ≥ 48 inches if used for an accessible means of egress
- **(CT) 1008.1.1 B&B doors shall be ≥ 28 inches with bath doors ≥ 24 inches**
- **(CT) 1008.9.5.1 - Bathroom subject to locking in Groups I-2, I-4 and R-4 shall allow unlocking from outside**
- **(CT) 1008.9.7 – Delayed egress locking must be approved for use and be signed for alarm**

AKF

General Principles - Stairways

Section 1009 - Stairways

- Measured from inside face of stringer to inside face of opposite stringer.



- Adding occupants served increases the width
- Exceptions can reduce the width
- Distance between handrails limits the usable width

Means of Egress Stairs

Section 1009 IBC Open Stairways

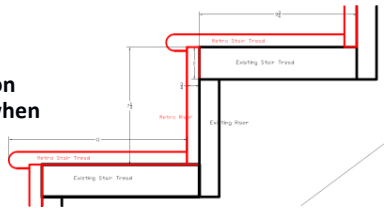
Not required to be enclosed when:

- **occupant load < 10 & stairway is not open to one level above or below its level of discharge**
- **Group A-5 exits where all portions of M.O.E are outside**
- **Serving & contained within a single residence**
- **Serve only an open parking garage**
- **Group I-3 buildings that comply with 408.3.8**
- **Required by Sections 410.5.3 and 105.6.1**
- **Serving a balcony, gallery, or press box per Section 1028.5.1**

Riser Heights, Tread Depths

Section 1009.7.2

- **Ranges: 4" to 7" riser; ≥11" tread; 11" tread at walkline of winders, ≥10" at any point**
- **Exceptions:**
  - **Spiral stairs (1009.12)**
  - **Alternating tread stair (1008.13)**
  - **Ship ladders (1009.14)**
  - **Aisle stairs (1028.11.2)**
  - **Within dwelling units**
  - **I-3 guard towers, observation towers and control rooms when ≤ 8" riser and ≥ 9" tread**
  - **R-1, B&B, R-2, and U occupancies accessory to R-3 uses, with risers ≤ 8-1/4" and treads ≥ 9"**
  - **Existing stairs may remain when risers/treads are ≤ 3/8" overall difference within any stair flight**



AKF

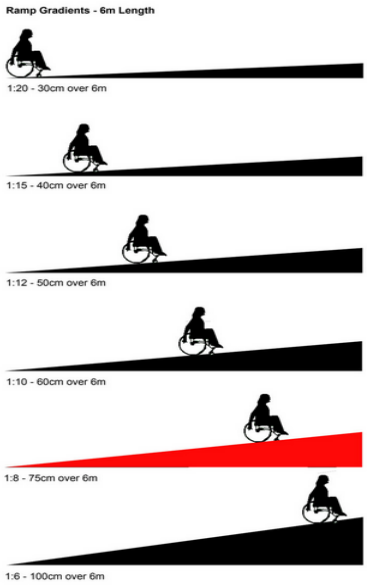
Bed & Breakfast - Stairways

Section 1009.7.2 – R-1 Exception 5

- **Landings/floors at egress door(s) ≤ 1½" lower than top of threshold.**
- **Doors other than egress doors required landings ≤ 8¼" bellow top of threshold.**
- **Stairways ≥ 36" clear width above handrail height.**
- **Railing projection ≤ 4½"**
- **Width of Stairway ≥ 31½"**
- **Riser height ≤ 8¼" and ≥ 4"**
- **Tread depth ≥ 9"**
- **Handrails shall be continuous**

AKF

Ramps



Section 1010 IBC Ramps

- **Slope not steeper than one unit of vertical in 12 units horizontal (8% slope). The slope of other pedestrian ramps shall not be steeper than one unit vertical in 8 units horizontal (12.5% slope).**

AKF

Means of Egress

Section 1011.2 Exit Signs – Floor Level

- Exits and exit access doors shall be marked by an approved exit sign readily visible from any direction of egress travel.
- Shall indicate direction of egress travel.
- **(CT) Floor proximity exit signs:**
- **Use Groups A*, B,**
- **Locations: 10-18 inches AFF**
- **Must be internally illuminated(?)**

AKF

Handrails and Guardrails

Section 1012-1013 Hand Rails/Guards

- (CT) 1012.9 Intermediate handrails
- (CT) 1013.3 Height Exceptions
- (CT) 1013.4 Openings Limitations
  - Exception for R-1 B&Bs

AKF

Exit Access

Section 1015 Spaces with Single Exit Access

TABLE 1015.1 SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY

OCCUPANCY	MAXIMUM OCCUPANT LOAD
A, B, E[a], F, M, U	49
H-1, H-2, H-3	3
H-4, H-5, I-1, I-3, I-4, R	10
S	29

AKF

Travel Distance

Section 1016 Travel Distance Measurement

- Maximum distance, measured from the most remote point on the story along the natural and unobstructed path of egress travel

Table 1016.1 Exit Access Travel Distance

OCCUPANCY	WITHOUT SPRINKLER SYSTEM (feet)	WITH SPRINKLER SYSTEM (feet)
A, E, F-1, M, R, S-1	200	250
I-1	Not Permitted	250
B	200	300
F-2, S-2, U	300	400
H-1	Not Permitted	75
H-2	Not Permitted	100
H-3	Not Permitted	150
H-4	Not Permitted	175
H-5	Not Permitted	200
I-2, I-3, I-4	Not Permitted	200

AKF

Means of Egress Aisles

Section 1017 IBC

- **From all occupied portions of the building to an exit**

AKF

Corridor Construction and Ratings

Section 1018 Corridors

- Construction
  - Fire-resistance rated

TABLE 1018.1 CORRIDOR FIRE-RESISTANCE RATING

OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE-RESISTANCE RATING (hours)	
		Without sprinkler system	With sprinkler system[c]
H-1, H-2, H-3	All	Not Permitted	1
H-4, H-5	Greater than 30	Not Permitted	1
A, B, E, F, M, S, U	Greater than 30	1	0
R	Greater than 10	Not Permitted	0.5
I-2[a], I-4	All	Not Permitted	0
I-1, I-3	All	Not Permitted	1[b]

AKF

Number of Exits

Section 1020 Single Means of Egress

TABLE 1021.2 STORIES WITH ONE EXIT

STORY	OCCUPANCY	MAXIMUM OCCUPANTS (OR DWELLING UNITS) PER FLOOR AND TRAVEL DISTANCE
First story or basement	A, B[d], E[e], F[d], M, U, S[d]	49 occupants and 75 feet travel distance
	H-2, H-3	3 occupants and 25 feet travel distance
	H-4, H-5, I, R	10 occupants and 75 feet travel distance
	S[a]	29 occupants and 100 feet travel distance
Second story	B[b], F, M, S[a]	29 occupants and 75 feet travel distance
	R-2	4 dwelling units and 50 feet travel distance
Third story	R-2[c]	4 dwelling units and 50 feet travel distance

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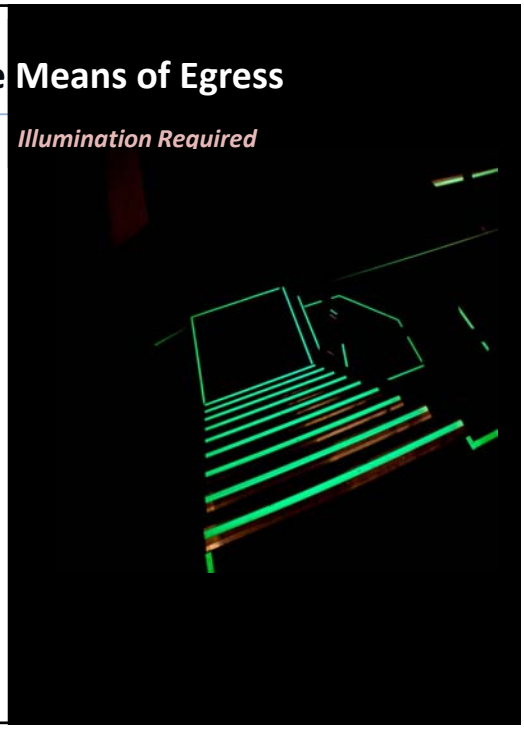
Illumination of the Means of Egress

Section 1024.1 - Illumination Required

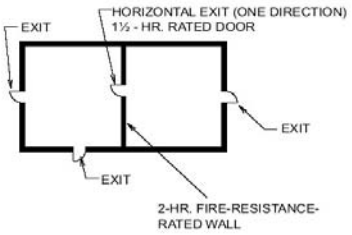


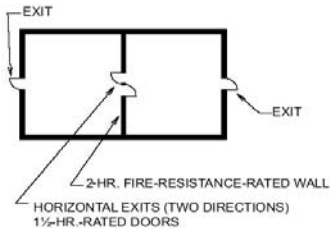
CT Exception: B&B w/fire alarm activation + emergency power

Horizontal Exit Requirements, Limitations

Section 1025 IBC Horizontal Exits

- Limited to not more than ½ of the total # of exits
- 2-hr fire wall or 2-hr fire barrier
- Extend though all levels unless supported by 2-hr rated floors
- Refuge area
  - 3 nsf / person, in general
  - 6 nsf / person for I-3
  - 15 nsf / person for ambulatory I-2
  - 30 nsf / person for non-ambulatory I-2





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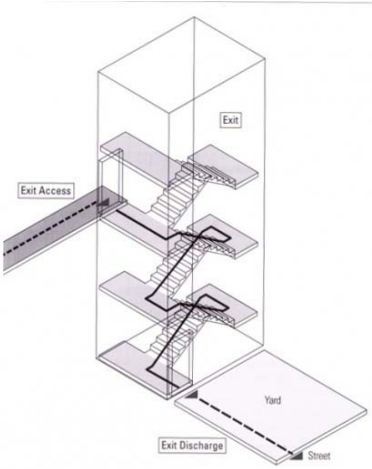
Exit Discharge Requirements

Section 1027 Exit Discharge



- Discharge directly to the exterior of the building at grade level or provide access to grade, w/o reentering the building
- The capacity of the exit discharge > the discharge capacity of the exits being served
- The exit discharge must provide a direct and unobstructed access to a public way
- The exit discharge located min. 10 feet from adjacent lot lines & other buildings on the same lot.

AKF

Questions/Resources (updated)

Available Over Your Internet Connection

- http://www.ct.gov/dcs/cwp/view.asp?a=4447&q=521446&dcsNav=|
- www.iccsafe.org/errata-central
- www.energycodes.gov/resource-center
- http://www.energycodes.gov/training-courses/ansiashraeies-standard-901-2013
- www.bcap-energy.org
- www.buildingscience.com
- www.akfgroup.com

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