Building Codes 103

Delving into the Details

Presented by the
Building Code & Regulations Committee
for the:

Building Codes and Regulations Committee

- Justin Bialek, AIA, Chairperson
- Jeff Winslow, AIA
  Vice Chairman
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- Ben Tiseo, FAIA

TODAY

- **YOU ASKED FOR IT!**
- Today we delve into some of the details and "fine print" in the codes

Codes Referenced in Today's AIAD BCRC Presentation

- The Following **Pending Codes** are Referenced in Today's Presentation
- Pending Code Updates (Presentation Based on ICC Code Versions and MI "Strikes & Bolds"):
- 2021 Michigan Building Code
- 2021 MI Uniform Energy Code
- ICC A117.1-2017 Barrier Free

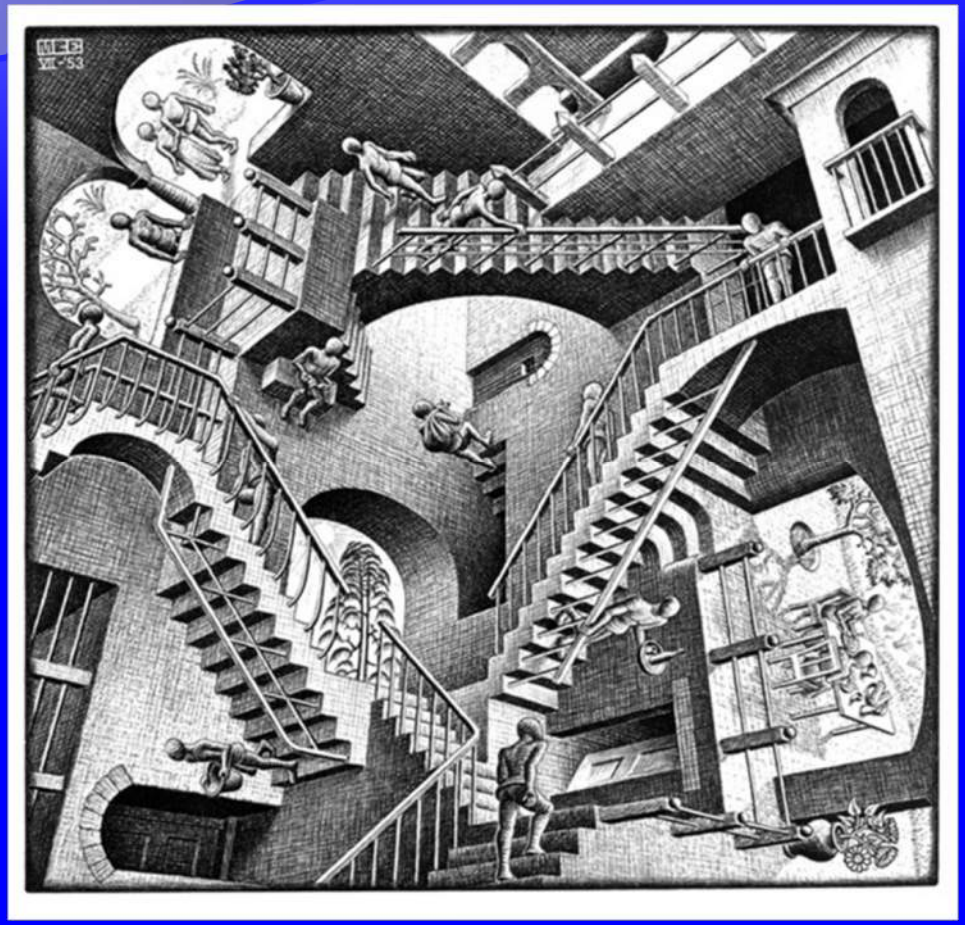
Codes Referenced in Today's AIAD BCRC Presentation

- The Following **Current Codes** are Referenced in Today's Presentation
  - 2021 MI Plumbing Code
  - 2021 MI Mechanical Code
  - 2023 MI Electrical Code (NEC)
  - 2016 MI Elevator Rules

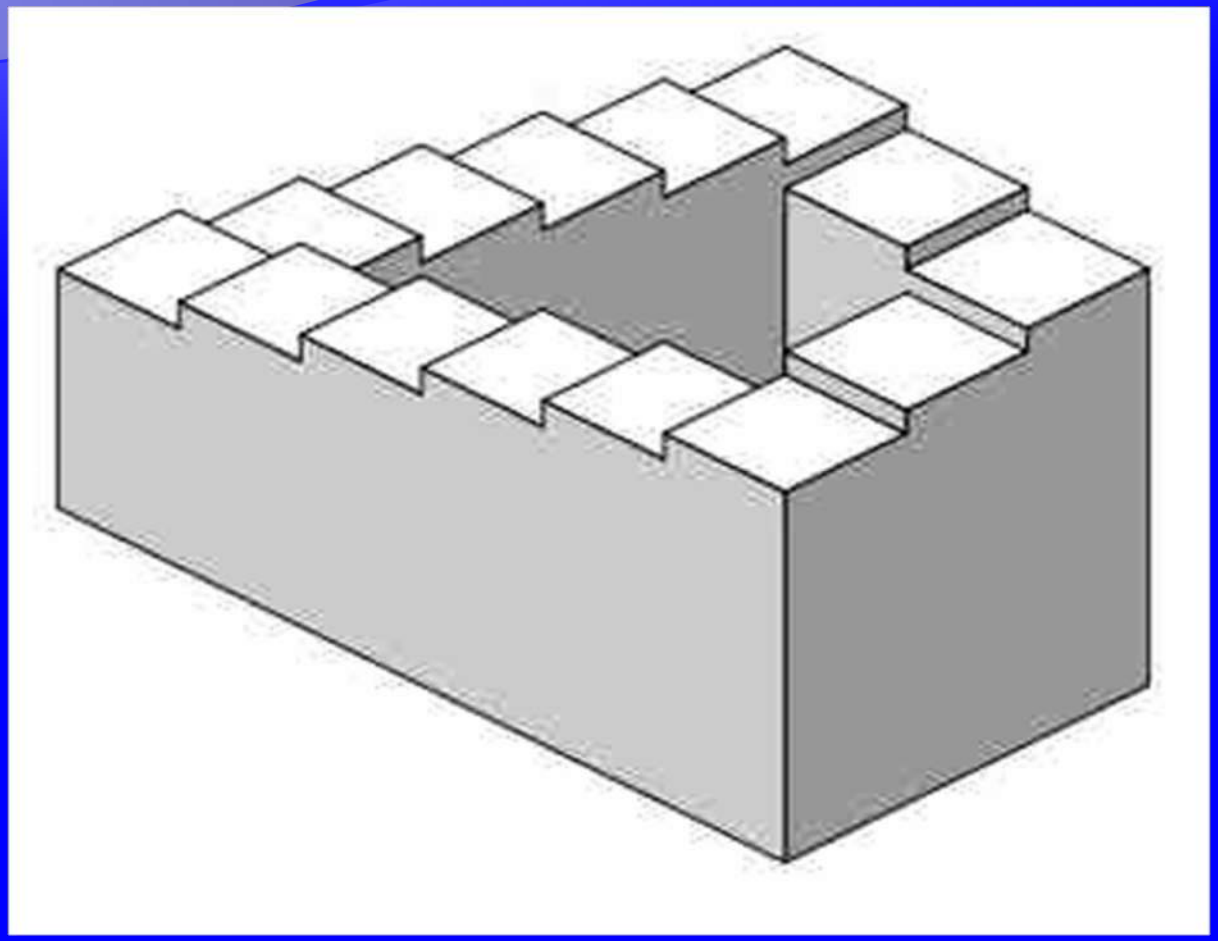
MI Codes Not Discussed Today

- NFPA
- Fire Codes (IFC, NFPA)
- MI Rehabilitation Code
- Masonry Code
- MI LARA Child Care Rules
- MI LARA Pool Rules MI LARA New and Existing School, College, and University Fire Safety
- Food Service Rules

Learning Code – Year 1



Learning Code – Year 40



Why Have A Code?

Structure Fires in the U.S.

(Data for 2015)

- 501,500 structure fires
- 2,685 civilian deaths
- $10.3 billion in property damage
- One structure fire every 63 seconds
- One home fire every 86 seconds
- One civilian death every 2 hours & 40 minutes
- 68 fire fighter deaths

Michigan Commercial Energy Code (MEEC)

Objectives:

Michigan Energy Code Status

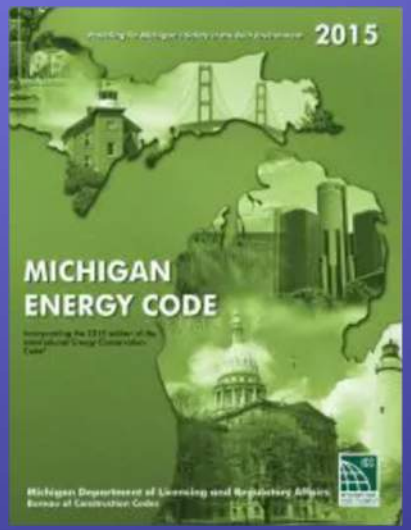
Highlight some important provisions of the energy code

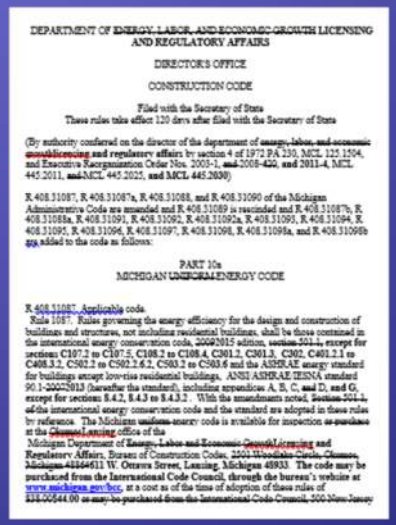
National Energy Code Systems

- ASHRAE 90.1 (American Society of Heating, Refrigerating and Air-Conditioning Engineers) (2022,2019,2016,2013,2010)
- IECC International Energy Conservation Code (2024,2021, 2018, 2015, 2012)

What document(s) make up the current Michigan Commercial Energy Code?

Michigan Commercial Energy Code = the Act
Part 10a+ portions of IECC 2015 + ASHRAE 90.1 (2013)




DEPARTMENT OF ENERGY, LABOR, AND ECONOMIC GROWTH LICENSING AND REGULATORY AFFAIRS

DIRECTOR'S OFFICE

CONSTRUCTION CODE

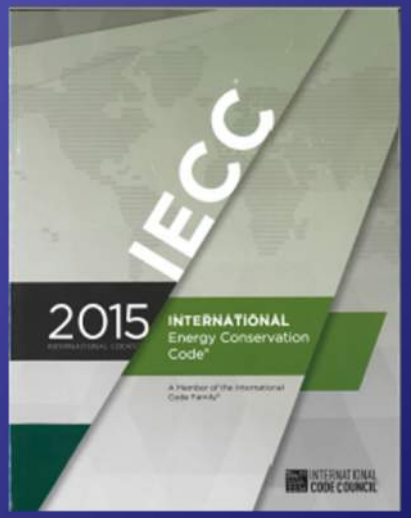
Filed with the Secretary of State
These rules take effect 120 days after filed with the Secretary of State

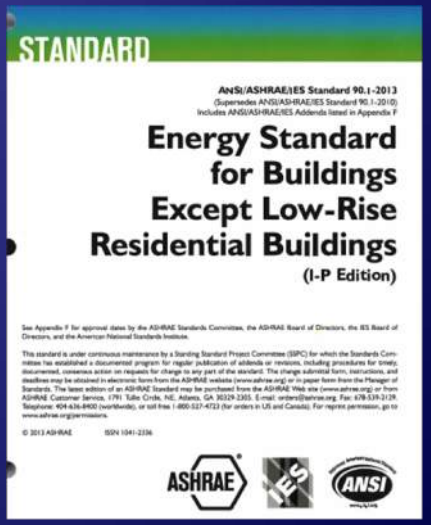
(By authority conferred on the director of the department of energy, labor, and economic growthlicensing and regulatory affairs by section 4 of 1972 PA 230, MCL 125.1504, and Executive Reorganization Order Nos. 2003-1, and 2008-420, and 2011-4, MCL 445.2011, and MCL 445.2025, and MCL 445.2030)

R 408.31087, R 408.31087a, R 408.31088, and R 408.31090 of the Michigan Administrative Code are amended and R 408.31089 is rescinded and R 408.31087b, R 408.31088a, R 408.31091, R 408.31092, R 408.31092a, R 408.31093, R 408.31094, R 408.31095, R 408.31096, R 408.31097, R 408.31098, R 408.31098a, and R 408.31098b are added to the code as follows:

PART 10a
MICHIGAN UNIFORM ENERGY CODE

R 408.31087. Applicable code.
Rule 1087. Rules governing the energy efficiency for the design and construction of buildings and structures, not including residential buildings, shall be those contained in the international energy conservation code, 20092015 edition, section 501.1, except for section: C107.2 to C107.5, C108.2 to C108.4, C201.2, C3013, C202, C401.2.1 to C408.3.2, C502.2 to C502.2.6.2, C503.2 to C503.6 and the ASHRAE energy standard for buildings except low-rise residential buildings, ANSI ASHRAE IESNA standard 90.1-20072013 (hereafter the standard), including appendices A, B, C, and D, and G, except for sections: 8.4.2, 8.4.3 to 8.4.3.2. With the amendment noted, Section 501.1, of the international energy conservation code and the standard are adopted in these rules by reference. The Michigan uniform energy code is available for inspection or purchase at the Olmsted Lansing office of the
Michigan Department of Energy, Labor and Economic GrowthLicensing and Regulatory Affairs, Bureau of Construction Codes, 2501 Woodlake Circle, Okemos, Michigan 48864611 W. Ottawa Street, Lansing, Michigan 48933. The code may be purchased from the International Code Council, through the bureau's website at www.michigan.gov/bcc, at a cost as of the time of adoption of these rules of $$$.00544.00 or may be purchased from the International Code Council, 500 New Jersey





Proposed Part 10a Act Language

Rule 1087. Rules governing the energy efficiency for the design and construction of buildings and structures, not including residential buildings, shall be those contained in the international energy conservation code, ~~2015~~ **2021** edition, **including appendix CB,** except for sections **C104.2 to C104.5**, ~~C107.2 to C107.5,~~ ~~C108.2 to C108.4,~~ **C109.1 to C109.4, C110.1 to C110.3,** ~~C301.2, C301.3, C302,~~ ~~C401.2.1 to C408.3.2,~~ ~~C502.2 to C502.2.6.2, C503.2 to C503.6~~ **appendix CA, and appendix CC**

and the ASHRAE energy standard for buildings, except low-rise residential buildings, ANSI/ASHRAE/IESNA standard 90.1-~~2013~~ **2019** ~~(hereafter~~**, referred to as** the standard **in these rules**~~)~~, including appendices A, ~~B~~, C, ~~D,~~ **E, F** ~~and~~ G, **H, and I.** ~~except for sections 8.4.2,8.4.3 to 8.4.3.2~~.

With the amendments noted, the international energy conservation code and the standard are adopted **by reference** in these rules ~~by reference~~.

August 16, 2023

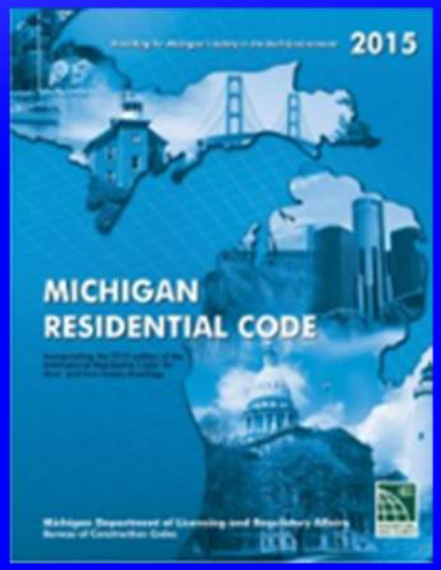
Current Michigan Residential Energy Code

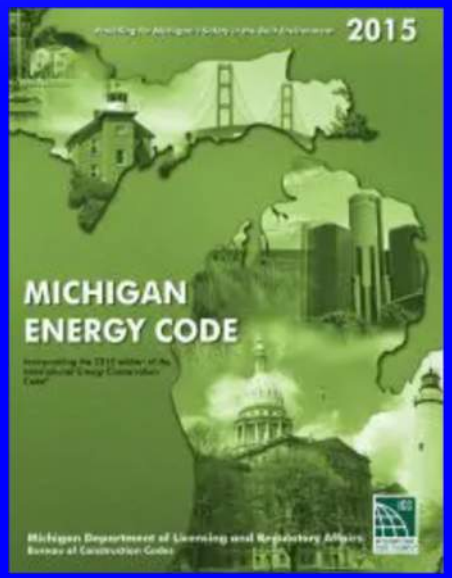
Michigan adopted IECC (2015) with Michigan Amendments
Entitled “Michigan Energy Code "Effective Feb 2016

Act Part 10

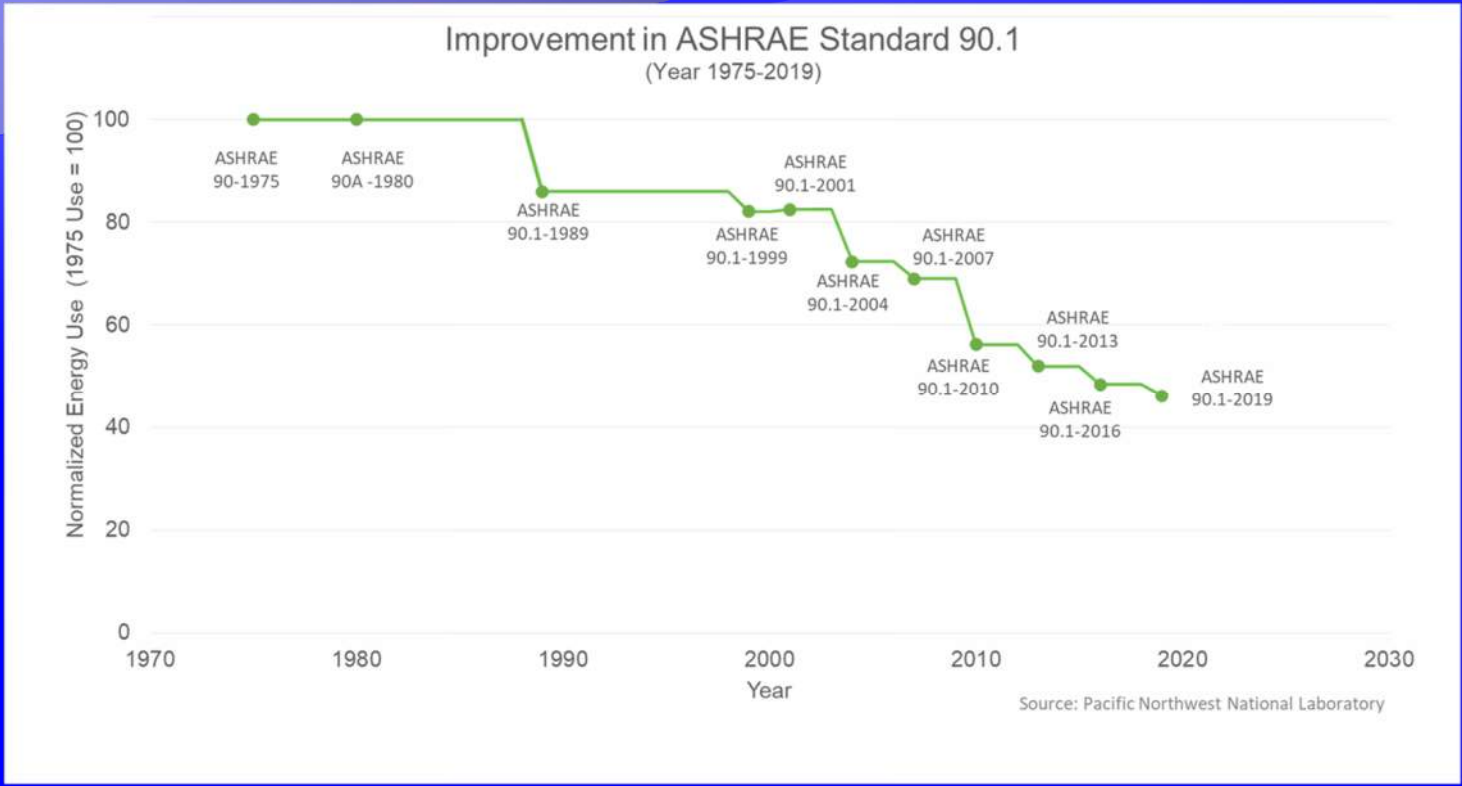
Included as Chapter 11 of MRC

- Applies to one and two family dwellings and townhouses





Historical Improvements in ASHRAE 90.1 Standard



National Energy Code Status - Commercial

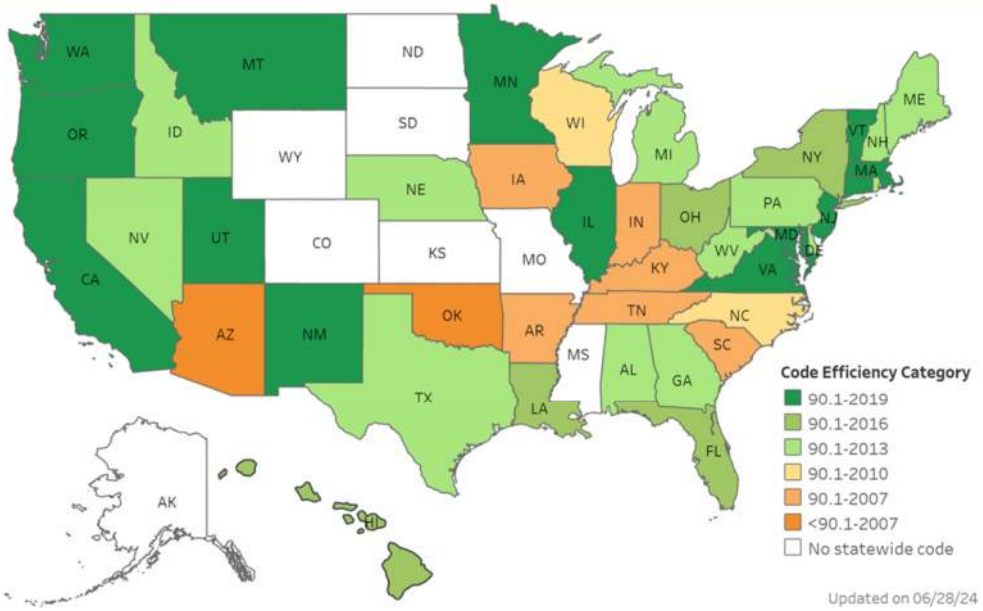


Table 1. Status of State Energy Code Adoption Map Summary - Commercial

Michigan^	2015 IECC and 90.1-2013	90.1-2013

State Portal | Building Energy Codes Program as of 6/28/2024 - viewed 9-8-2024

National Energy Code Status -Residential

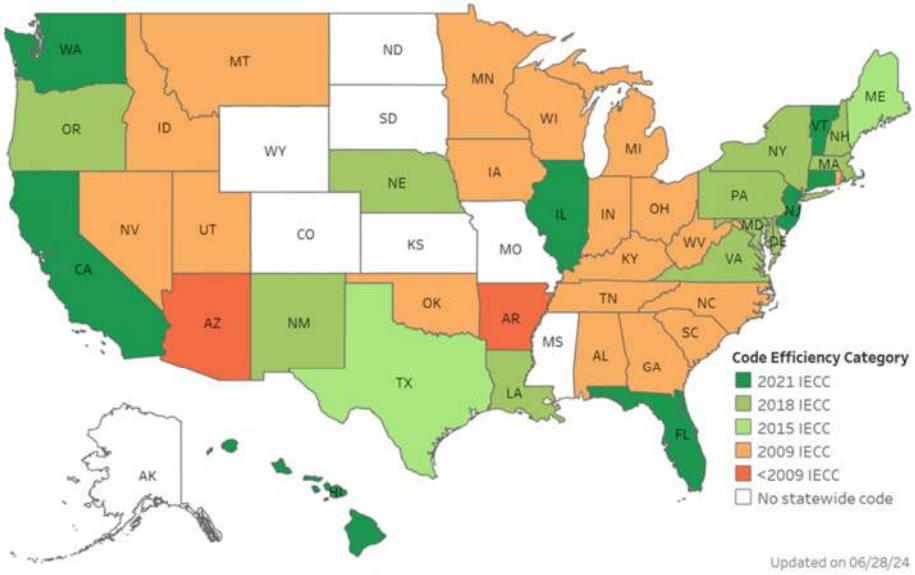


Table 1. Status of State Energy Code Adoption Map Summary - Residential

Michigan	2015 IECC with amendments	2009 IECC

State Portal | Building Energy Codes Program as of 6/28/2024 - viewed 9-8-2024

Michigan Energy Adoption Update

- **New energy codes for Michigan are undetermined at this time**

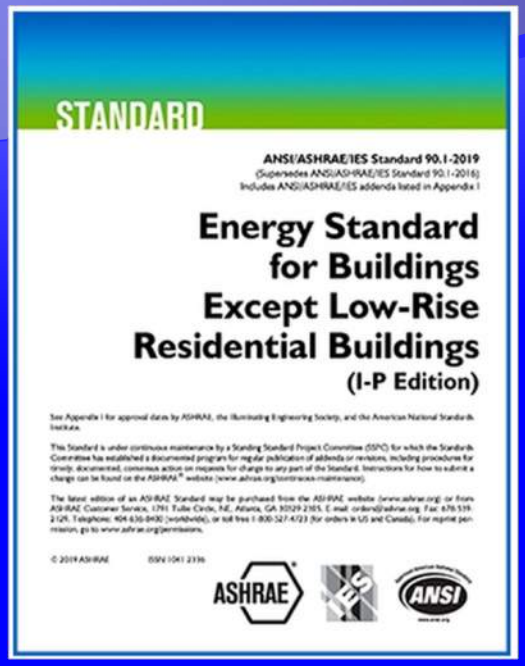
- Stay tuned
- Nothing adopted yet

ASHRAE and IECC

Although there are close similarities, some specific requirements differ between IECC 2021 and ASHRAE 90.1 2019

If Michigan does adopt IECC 2021 for commercial buildings: Section C 401.2 allows for ASHRAE 90.1 (2019) as alternate compliance path

ASHRAE 90.1 2019


STANDARD

ANSI/ASHRAE/IES Standard 90.1-2019
(Supersedes ANSI/ASHRAE/IES Standard 90.1-2016)
Includes ANSI/ASHRAE/IES addenda listed in Appendix I

Energy Standard for Buildings Except Low-Rise Residential Buildings
(I-P Edition)

CONTENTS

ANSI/ASHRAE/IES Standard 90.1-2019
Energy Standard for Buildings Except Low-Rise Residential Buildings (I-P Edition)

Standard 90.1-2019 - American Society of Heating, Refrigerating and Air-Conditioning Engineers (iwrapper.com) viewed September 13,2021

MEC current and proposed rules guidance

Michigan Energy Codes Compliance Collaborative

About › Divisions and Offices › Materials Management › Energy › Codes

Commercial Energy Code Compliance Aids

Commercial Codes Comparison

Commercial Blower Door Testing

Commercial Lighting Controls Functional Testing

Commercial Skylighting

Michigan Energy Code Compliance Aid:
COMPARATIVE COMMERCIAL PROVISIONS HIGHLIGHTS for ASHRAE 90.1-2013, ASHRAE 90.1-2019, and the 2021 IECC

Michigan's Bureau of Construction Codes (BCC) administers the Stille-DeRossett-Hale Single State Construction Code Act 230 of 1972, commonly known as Act 230. One of the many provisions in this Act is the requirement to regularly update Michigan's building codes, including its building energy code. By law, the commercial building energy provisions are updated every three years and the residential building energy provisions are updated every three to six years.

Similar to Michigan's other construction codes, its energy code is based on the code established by the International Code Council (ICC). Michigan's energy code may include the ICC's International Energy Conservation Code (IECC) in whole or in part, including any or all of the standards referenced therein. One of the standards referenced in the IECC is ASHRAE Standard 90.1: *Energy Standard for Buildings Except Low-Rise Residential Buildings*. Currently, the technical basis for Michigan's energy code is the 2015 IECC for residential buildings and ASHRAE 90.1-2013 for commercial buildings, including multi-family buildings with more than 3 stories above grade.

The current 2015 Michigan Energy Code (MEC), is presently under review. Updates to the MEC mean that Michigan's building stock will become progressively more energy efficient, creating savings for families and businesses. According to the draft proposals issued by the BCC, the next iteration of the MEC will likely be based on the 2021 IECC for residential structures and the designers' choice of the 2021 IECC or ASHRAE 90.1-2019 for commercial buildings.

Michigan Energy Codes Compliance Collaborative date visited 11/15/2024

Commercial Code Comparison -snapshot

Table B. Updates to Provisions for Verification, Function Testing & Commissioning

The current Michigan Energy Code (2015 MEC) is based on ASHRAE Standard 90.1-2013. The 2015 MEC is currently under review for updating and the next iteration of the MEC will likely have compliance paths that follow the 2021 IECC and ASHRAE 90.1-2019.

The table below summarizes the major differences between existing prescriptive provisions of the 2015 MEC, the 2021 IECC, and ASHRAE 90.1-2019 that pertain to energy performance quality assurance for projects located in Michigan. Where provision numbers are included, the inclusion of all subsequent numbers and exceptions is implied. For example, mention of §4.2.5.2, also includes §4.2.5.2.1, 4.2.5.2.2, and any exceptions thereto.

Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013.

This document does not replicate code or standard language verbatim and is neither a point-by-point nor a provision-by-provision comparison. This list is not exhaustive, and each provision may have nuances, exemptions, or additional requirements that may not be addressed in this document. The reader is referred to the source documents for complete details on the criteria, requirements, and exceptions.

Current MEC-2015 (ASHRAE 90.1-2013)	ASHRAE 90.1-2019	IECC-2021
Provision Content of Concern	**Significant Changes From Current MEC**	**Significant Changes From Current MEC**
4.2.4 In general, verification is provided by the code official's inspection of all building construction, alterations, and additions subject to code provisions.	4.2.4 thru 4.2.5.3; 5.9; 6.9; 7.9; 8.9; 10.9 Functional performance testing and commissioning of all systems are added as general components of verification. Criteria are summarized in §4.2.5 with details in enumerated building sections	C105.2 - C105.2.6; and C408 Functional performance testing and commissioning (as defined by the IECC) of all systems are added as general components of verification. Commissioning must be in compliance with

What do energy codes cover?

Administrative Provisions

Administrative Requirements and Scope
Definitions
Enforcement Provisions
Climate Zones
General Requirements

For Michigan found in the retained portions of IECC 2015 as amended in Act Part 10a

What do energy codes cover?

Technical Provisions

Envelope Requirements
HVAC
Service Water Heating
Lighting and Power
Equipment
Trade-offs
Analysis Requirements
Appendices
Reference Standards

For Michigan ASHRAE 90.1 (2013)
as amended by Act Part 10a

Scoping and Application

- New Buildings
- Additions
- Renovations

Important Considerations

Compliance paths

Climate Zones

Which code will govern your project Part 10a or Part 10

Mandatory Provisions

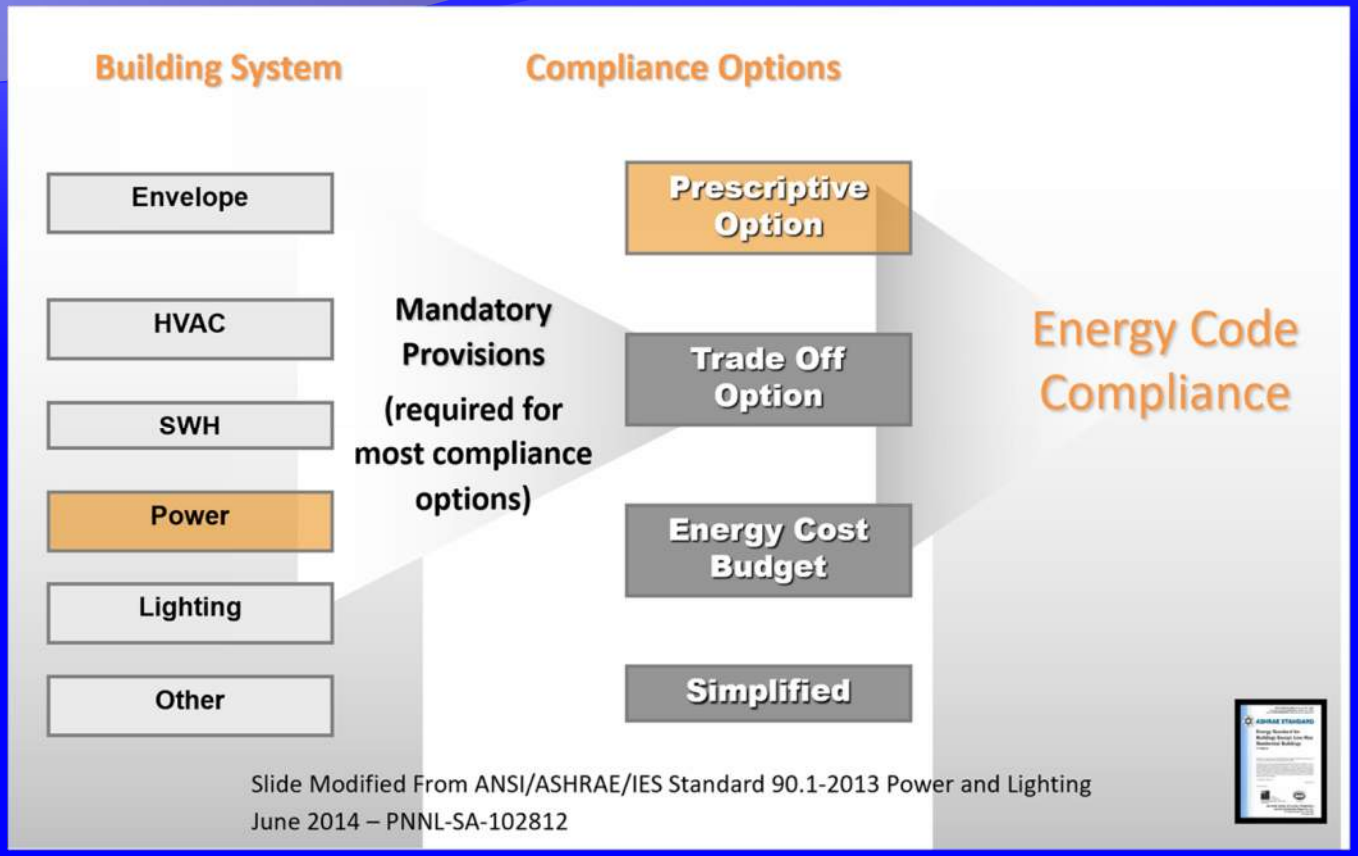
- Some requirements are mandatory
- Other provisions provide for options, prescriptive or performance approaches

Typical ASHRAE 90.1 Chapter Layout

Technical Sections 5,6,7,8,9, and 1010

General (Section - .1)
Compliance Methods (Section - .2)
Simplified Building (Section - .3)
Mandatory Provisions (Section - .4)
Prescriptive Path (Section - .5)
Alternate Compliance Path (Section - .6)
Submittals (Section -.7)
Product Information and Installation (Section - .8)
Verification, Testing and Commissioning and Inspection (.9)
Tables

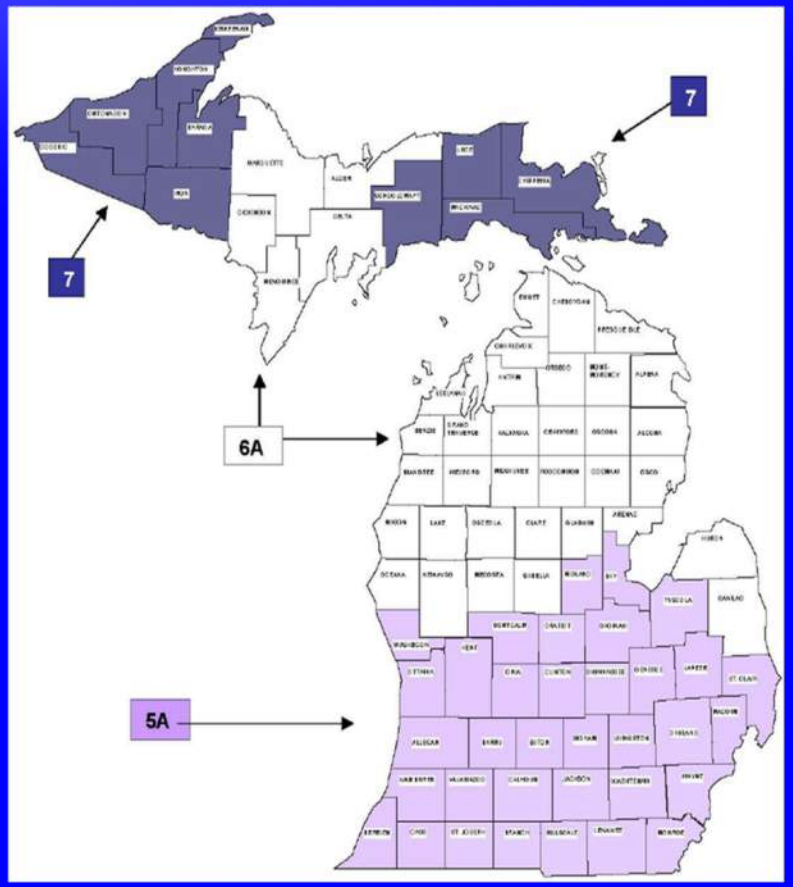
Compliance Paths



Climate Zones

Counties that may change

- Baraga 7 to 6a
- Chippewa 7 to 6a
- Gogebic 7 to 6a
- Houghton 7 to 6a
- Huron 6a to 5a
- Iron 7 to 6a
- Luce 7 to 6a
- Mackinac 7 to 6a
- Marquette 6a to 7
- Ontonagon 7 to 6A



Which code governs?

Platform Building

One story steel or concrete first floor retail with fire separation
+
3-4 stories wood residential over

ASHRAE 90.1 (2013) will apply until new code is adopted

Best to confirm with AHJ for your specific project

Which code governs?

2 story 16 unit wood framed apartment building

Michigan residential energy code provisions will be applied to buildings classified as R2, R3, R4 not more than three stories above grade Note R1 (Hotels, Motels, Boarding Houses, Congregate Housing more than 10 people) are under Michigan Commercial energy code

Best to confirm with AHJ for your specific project

Why does it matter which code governs?

An example - Framed roofs Zone 5A

Commercial **R49** (ASHRAE 90.1 (2013) current
Residential **R38** (MEC 2017) current
Commercial **R49** under ASHRAE 90.1 (2019)
Residential **R60** under IECC 2021 if adopted

Why does it matter which code governs?

Other Reasons:

Residential code requires blower door testing commercial code does not.

For commercial projects COMCheck applies in Michigan RESCheck currently cannot be applied in Michigan due to amendments.

ASHRAE 90.1 has extensive vestibule, skylight, lighting and HVAC provisions that the residential code does not.

Documentation Requirements ASHRAE 90.1 (2013)

- Documentation requirements are separated by systems and are indicated in the individual technical subsection .7 (example 5.7 or 6.7 submittals)
- 5.7 .1-5.7.4

- Building envelope submittals to include:
  - Space conditioning categories
  - Fenestration VT, SHC,U-factor,and leakage rate
  - Daylit floor areas
  - Insulation R-values
  - Air barrier materials and installation details

6.7.2.1 - 6.7.2.2

- Construction documents must indicate that within 90 days of acceptance, record documents and O&M manuals for each HVAC system or piece of equipment requiring maintenance in the HVAC system be provided to the owner.

ASHRAE 90.1 (2019) is expanded to include:

Compliance documentation must be submitted.

Building envelope submittals & record documents requirements are expanded to also include:

- Verified air leakage test results
- Signed, dated insulation certificate with
  - -Type
  - -Manufacturer
  - - Rated R-value
  - -Initial and settled thicknesses
  - -Coverage area

Documentation Requirements ASHRAE 90.1 (2013)

A comprehensive list can be found in the code comparison document available from MI Energy Code Compliance Collaborative

(ASHRAE 90.1-2013)		
Provision Content of Concern	Significant Changes From Current MEC	Significant Changes From Current MEC
2 thru 4.2.2.3 M Manuals must be provided to the er for: AC systems ctrical & Power system hting systems	4.2.2 thru 4.2.2.3 O&M Manuals must be provided to the owner for: • Building envelope • HVAC systems • SWH systems • Electrical & Power system • Lighting systems • Other systems (i.e., elevators)	C408 O&M Manuals must be provided for the building, systems, and equipment. Equipment must include a label with the regularly required maintenance tasks as well as the identifying information for the model-specific O&M Manual.
hru 5.8.1.1 ding envelope submittals to include: ace conditioning categories nestration VT, SHGC, U-factor, and kage rate ylit floor areas ulation R-values barrier materials and installation tails	5.7.3.1 and 5.8.1.11 Building envelope submittals & record documents requirements are expanded to also include: • Verified air leakage test results • Signed, dated insulation certificate with - Type - Manufacturer - Rated R-value - Initial and settled thicknesses - Coverage area	C103.2 Information required matches ASHRAE 90.1-2019.

Vestibules 5.4.3.3

Vestibule exceptions are considerably revised in ASHRAE 90.1 (2019) under the proposal there will no longer be the Michigan Amendments in PA 10a.

Exceptions:

1. Doors not intended as a building entrance. (See definition)
2. Doors opening directly from a dwelling unit.
4. Doors opening into a semiheated space.
7. Buildings with less than 1000 ft^2 of conditioned space
8. Doors that open directly from a space. less than 3,000 $feet^2$ (298 m^2) in area if there is a separate building entrance
10. Some cases for buildings 15 stories or less with air curtains

Some exceptions are eliminated (revolving doors, overhead doors serving outdoor eating areas, exception 8 is a big change.

Fenestration

- 5.4.3.2 Air Leakage
- Table 5.5.1 U Factors, SHGC,VLT by frame type
- 5.5.4.1-5.4.2 Fenestration Area
- 5.5.4.2.2 Maximum Skylight Area
- 5.5.4.2.3 Minimum Skylight area
- 5.5.4.3 Fenestration U Factors
- 5.5.4.4 Fenestration Solar Heat Gain
- 5.5.4.5 Fenestration Orientation (slight change to denominator)
- 5.5.4.6 Visible Transmittance/SHGC Ratio
- 5.7 Submittals (VLT,U factor, Daylit Areas)
- 5.8 Product Information and Installation Requirements

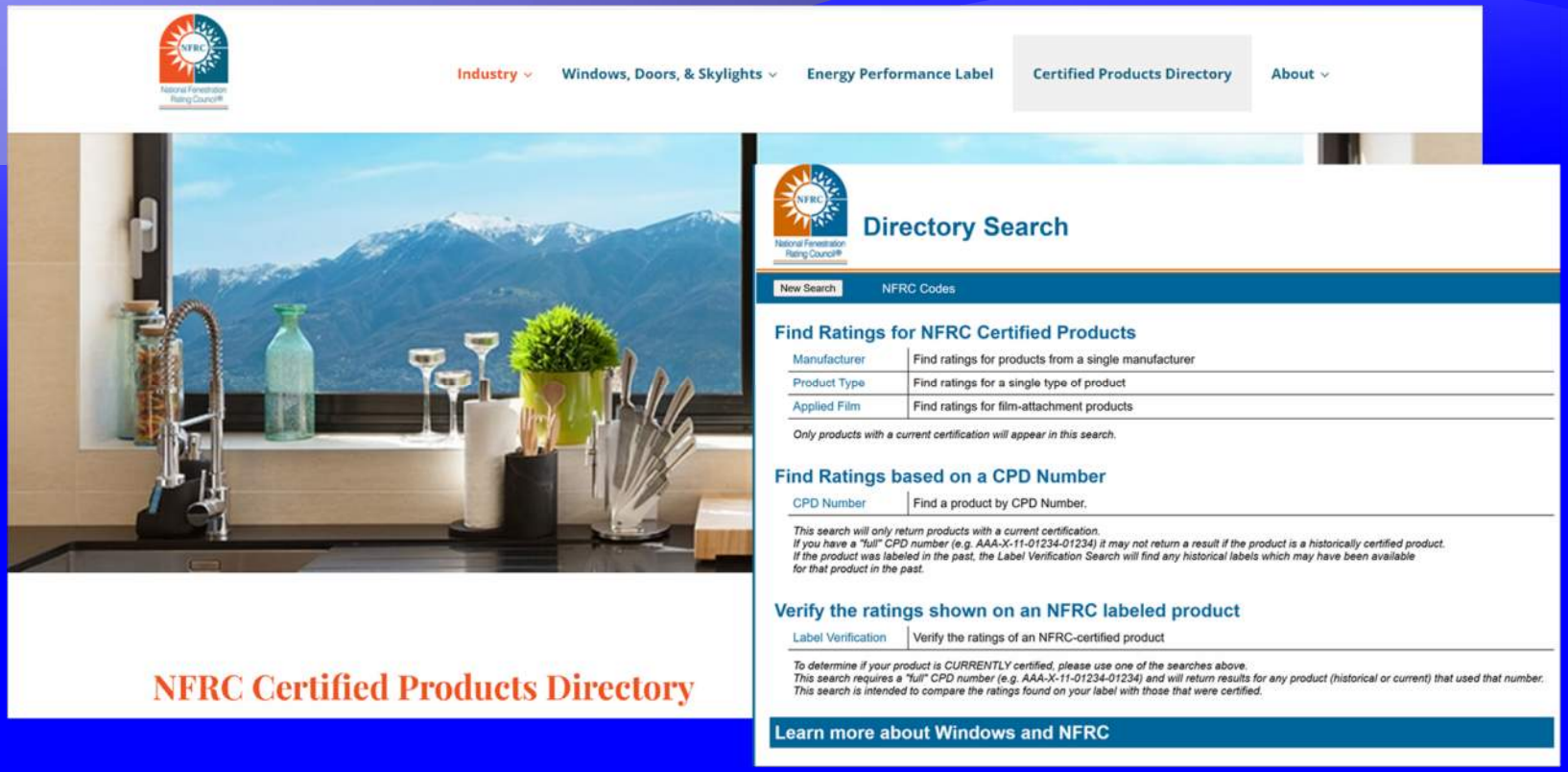
Zone 5 not U=.36 for fixed windows and .45 for operable

Products must be certified by NFRC or Testing or
Default Tables A81.1, A81.2,A8.2 for unlabeled products must be used

U factors are for complete assembly not just the glass


Site visit UL Labs Chicago 2017

Fenestration and NFRC



Skylights 5.5.4.2.3

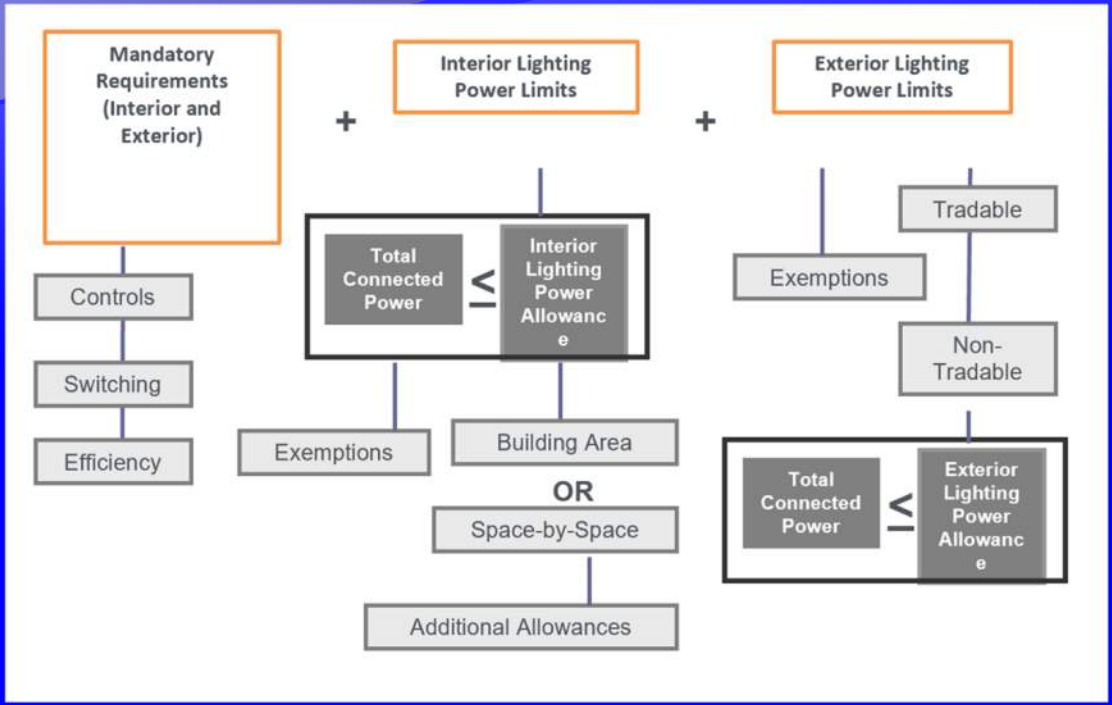
Minimum skylight area must be provided in enclosed spaces that are ≥ 2,500 ft² In spaces with ceiling height > 15 ft and certain space types

- *Office*
- *Lobby*
- *Atrium*
- *Concourse*
- *Corridor*
- *Storage (incl. nonrefrigerated warehouse)*
- *Gymnasium/fitnes s/exercise*
- *Area, playing area*
- Gymnasium seating
- Convention exhibit/event space
- Courtroom
- Automotive space
- Fire state engine room
- Manufacturing
- *Corridor/transition and bay areas*
- *Retail*
- *Library reading and stack areas*
- *Distribution/sorting area*
- *Transportation*
- *Baggage and seating areas*
- *Workshop*

There are some narrow exceptions to this requirement. For example cliamte zones 6-8.

So why don't more buildings seem to comply?

Lighting Requirements ASHRAE 90.1 Section 6



Source: slide modified from www.energycodes.gov ANSI/ASHRAE Standard 90.1 2013 Power and Lighting - VISITED SEPT. 5, 2017

Lighting Power Density ASHRAE 90.1 Section 9.2.2.3

Part of Table 9.5.1 shown below. Complete table in the Standard has 32 different building types

There are a number of exceptions listed in 9.2.2.3 for various lighting equipment which is not required to be included in calculating the lighting power density

Can use building the simplified method, "area method" or "space by space method"

Similar approach is used for exterior lighting systems

Building Type	Lighting Power Density (W/ft^2)
Automotive Facility	.75
Convention Center	.64
Court House	.79
Dining: Bar Lounge/Leisure	.8
Dining: Cafeteria/Fast Food	.76
Dining: Family	.71
Dormitory	0.53
Exercise Center	0.72

Source: slide modified from www.energycodes.gov ANSI/ASHRAE Standard 90.1 2019 Power and Lighting, visited 9/11/2021.

Lighting controls ASHRAE 90.1 Section 9.4 Mandatory Provisions 9.4.1.1-9.4.1.4

Table 9.6.1 *Lighting Power Density* Allowances Using the Space-by-Space Method and Minimum *Control* Requirements Using Either Method

			The *control* functions below shall be implemented in accordance with the descriptions found in the referenced paragraphs within Section 9.4.1.1. For each *space* type: (1) All REQs shall be implemented. (2) At least one ADD1 (when present) shall be implemented. (3) At least one ADD2 (when present) shall be implemented.								
Informative Note: This table is divided into two sections; this first section covers *space* types that can be commonly found in multiple *building* types. The second part of this table covers *space* types that are typically found in a single *building* type.			Local *Control* (See Section 9.4.1.2 [a])	Restricted to *Manual* ON (See Section 9.4.1.2 [b])	Restricted to Partial *Automatic* ON (See Section 9.4.1.2 [c])	Bilevel Lighting *Control* (See Section 9.4.1.3 [d])	*Automatic* Daylight Responsive *Controls* for Sidelighting (See Section 9.4.1.4 [e][a])	*Automatic* Daylight Responsive *Controls* for *Toplighting* (See Section 9.4.1.4 [f][a])	*Automatic* Partial OFF (See Section 9.4.1.5 [g] [Full Off complies])	*Automatic* Full OFF (See Section 9.4.1.5 [h])	Scheduled Shutoff (See Section 9.4.1.5 [i])
Common *Space* Types[1]	*LPD* Allowances, W/ft²	*RCR* Threshold	a	b	c	d	e	f	g	h	i
Atrium											
<20 ft in height	0.39	NA	REQ	ADD1	ADD1		REQ	REQ		ADD2	ADD2
≥20 ft and ≤40 ft in height	0.48	NA	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
>40 ft in height	0.60	11	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Audience Seating Area											
Auditorium	0.61	6	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Gymnasium	0.23	6	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Motion picture theater	0.27	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Penitentiary	0.67	4	REQ	ADD1	ADD1		REQ	REQ		ADD2	ADD2
Performing arts theater	1.16	8	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Religious facility	0.72	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Sports arena	0.33	4	REQ	ADD1	ADD1		REQ	REQ		ADD2	ADD2
All other audience seating areas	0.23	4	REQ	ADD1	ADD1		REQ	REQ		ADD2	ADD2

Source: slide modified from www.energycodes.gov ANSI/ASHRAE Standard 90.1 2019 Power and Lighting - VISITED 9/11/2021

Commissioning and Quality Control

- Each technical section has its own quality control measures-
- Expect extensive verification and commissioning requirements in the new code when it gets adopted

Table 2A. Updates to Provisions for Verification, Function Testing & Commissioning

Current MEC-2015 (ASHRAE 90.1-2013)		ASHRAE 90.1-2019		IECC-2021	
Provision No.	Provision Content (Title or Summary)	Provision No.	Significant Changes From Current MEC	Provision No.	Significant Changes From Current MEC
4.2.4	In general, verification is provided by code official inspection of all building construction, alterations and additions subject to code provisions. Equipment & components to inspected include, but are not limited to: • Wall insulation & vapor retarders • Roof & ceiling insulation • Slab or foundation-wall intersection • Fenestration • Continuous air barrier • Mechanical systems & controls • Electrical systems & controls	4.2.4 thru 4.2.5.3; 5.9; 6.9; 7.9; 8.9; 10.9	Functional performance testing and commissioning of all systems are added as general components of verification. Functional testing and commissioning requirements (previously only included under certain building system sections) are summarized in §4.2.5 with details in building system sections enumerated as X.9. They are also expanded to include the building envelope air leakage (§5.9) and other systems such as elevators, and booster pumps (§10.9). The power system (§8.9) and service water heating system (§7.9) are provided as separate subdivision sof electrical and mechanical systems. Commissioning must be in compliance with	C105.2 - C105.2.6; and C408	Functional performance testing and commissioning (as defined by the IECC) of all systems are added as general components of verification. Commissioning (Function Testing) must be performed for: • HVAC systems – Equipment functional test – Equipment adjust & balance – Controls functional test – Economizer functional test • SWH functional test • Lighting controls functional test Commissioning must be in compliance with 2021 IECC functional test criteria.

COMcheck – Compliance Tool

COMcheck Software Version 4.0.7.0

Envelope Compliance Certificate

Project Information

Energy Code:	90.1 (2013) Standard
Project Title:	
Location:	Holland, Michigan
Climate Zone:	5a (weather data: USA_MI_Muskegon.County.AP.726360_TMY3.epw)
Project Type:	New Construction
Vertical Glazing / Wall Area:	4%
Performance Sim. Specs:	EnergyPlus Version 8.1.0.009

Construction Site: Owner/Agent: Designer/Contractor:

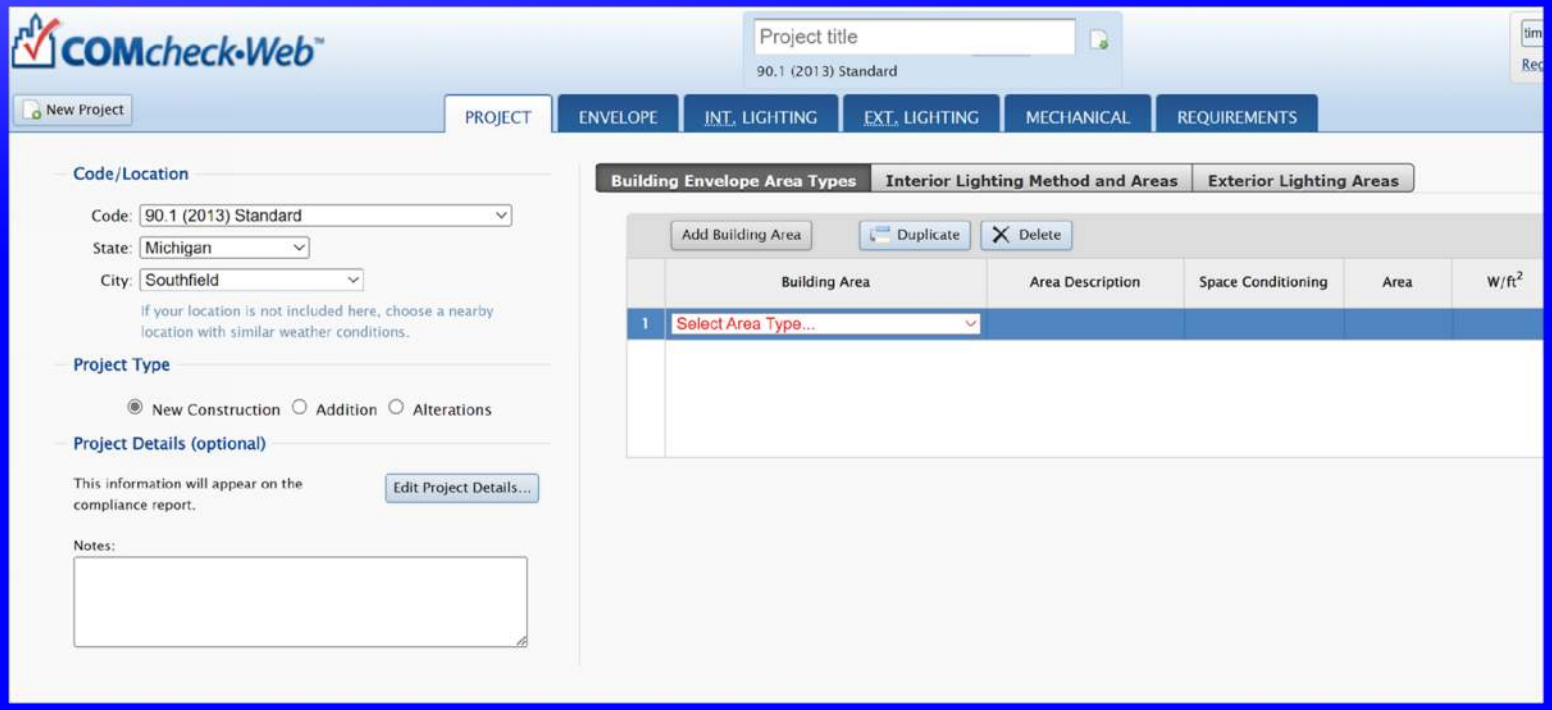
Building Area	Floor Area
1-manufacturing (Workshop) : Nonresidential	6000

Envelope Assemblies

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Proposed U-Factor	Budget U-Factor(a)
Roof 1: Metal Building, Standing Seam, Liner System without Thermal Blocks, [Bldg. Use 1 - manufacturing]	5820	30.0	0.0	0.040	0.037
Skylight 1: Metal Frame with Thermal Break:Glass, With Curb, Perf. Specs.: Product ID Product label, SHGC 0.39, VT 0.90, [Bldg. Use 1 - manufacturing] (b)	180	---	---	0.300	0.500
Floor 2: Slab-On-Grade:Unheated, Vertical 4 ft., [Bldg. Use 1 - manufacturing] (c)	320	---	20.0	0.434	0.520
NORTH					
Exterior Wall 1: Metal Building Wall, Double Layer Mineral Fiber, [Bldg. Use 1 - manufacturing]	1480	19.0	10.0	0.060	0.050
Window 1: Metal Frame:Fixed, Perf. Specs.: Product ID Product Label, SHGC 0.40, VT 0.90, [Bldg. Use 1 - manufacturing] (b)	200	---	---	0.280	0.420
Door 1: Insulated Metal, Swinging, [Bldg. Use 1 - manufacturing]	40	---	---	0.500	0.500
EAST					
Exterior Wall 1 copy 2: Metal Building Wall, Double Layer Mineral Fiber, [Bldg. Use 1 - manufacturing]	800	19.0	10.0	0.060	0.050

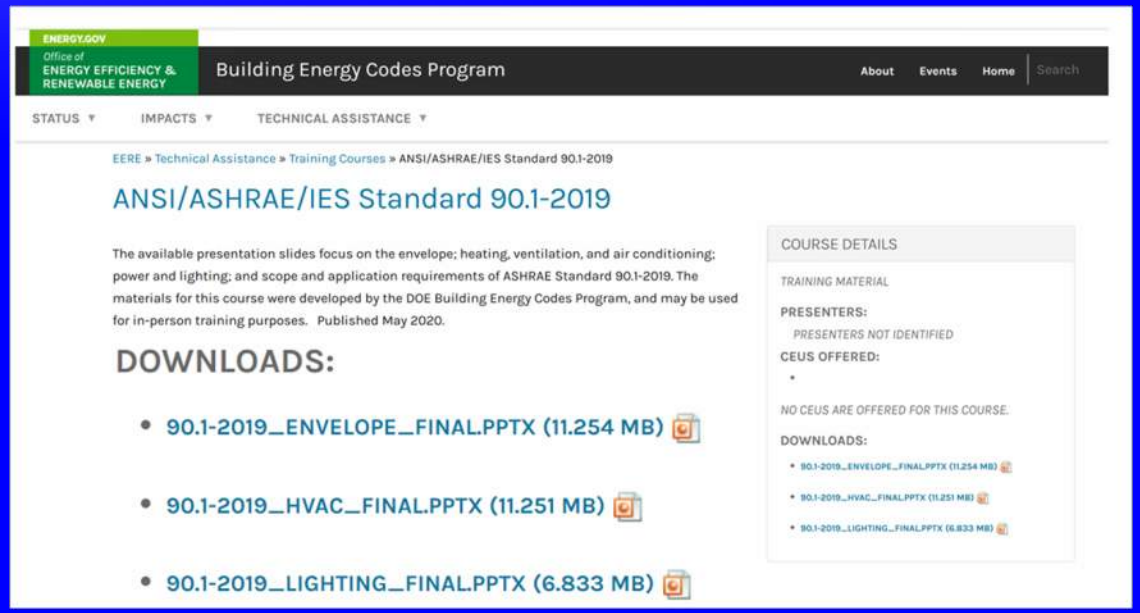
- COMcheck-Web: Home Page date visited November 15, 2024

COMcheck – Compliance Tool

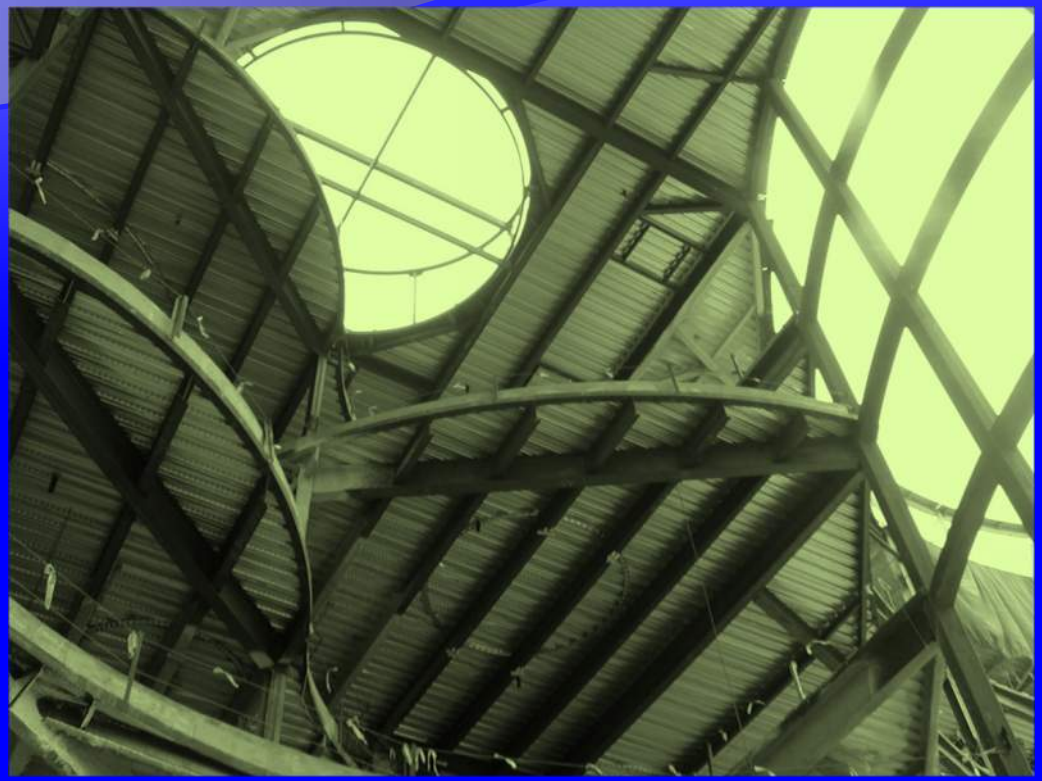


Resources – www.energycodes.gov

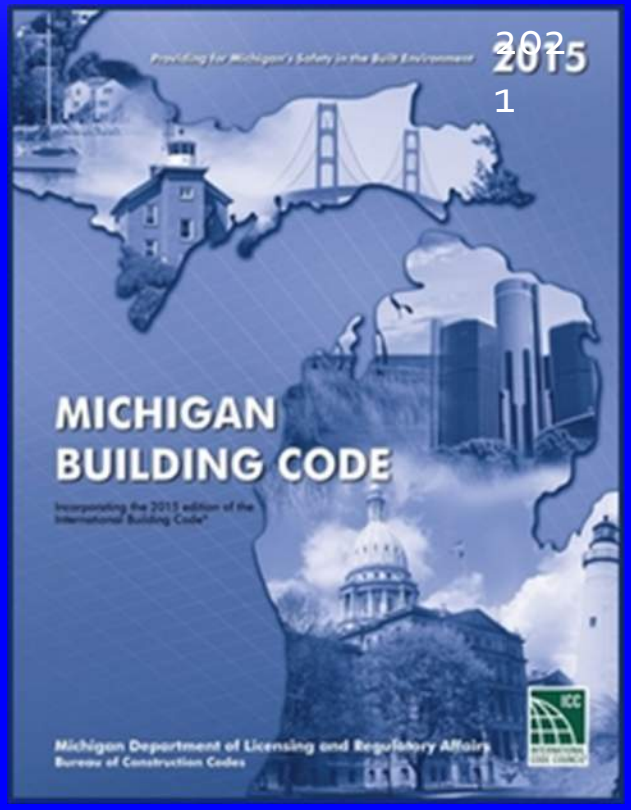
https://www.energycodes.gov/technical-assistance/training/courses/ansiashraeies-standard-901-2019



Q and A



2021 Michigan Building Code (Some day?)



The Michigan Building Code

Inside Front Cover:

Precedence: Michigan Construction Code Act, PA 230 of 1972 as amended by PA 245 of 1999; Rules, Part 4: R 408.30402.

- **1999: One State Construction Code Adopted**.
- **Fire Codes vary by municipality**.

Useful Information

- When do you use the Michigan Rehabilitation code in lieu of the Michigan Building Code?
  - Use the rehabilitation code for any building renovation, interior build-out, or addition to an existing building
  - List the primary code you are using on the drawings. Do not just list both or the building official will assume you are adhering to both.

Useful Information

- Check out "Effective use of the International Building Code" Pages ix to xvii. This is a brief summary of each chapter.
- Revisions to the Code (margin markings)
  - Single Line = ICC Revision
  - Double Line = MI Revision
  - Arrow = Deletion
  - Single Bullet = Text or Table has been moved
  - Double Bullet = Text or Table has been moved here.

Useful Information

- ***Always start with the highest level of the 'scoping' provision before applying subsections***
  - Section 713.4.1.1.2 does not apply to your project if the higher level of the section, Section 713.4, doesn't apply.
  - **Don't "Cherry Pick" the Code.**

Read the Books!

- A thorough, complete code review is more than filling out a standard checklist.
- **You need to thoroughly read through all of the code books having jurisdiction!**
- Don't rely on memory. Look it up.

CHAPTER 1
SCOPE AND ADMINISTRATION

"IT'S THE LAW"

Scope and Administration

- Chapter 1 establishes the code as law by act of the Michigan state legislature.
- This short chapter is very powerful.
- It is worth reading and understanding.

Scope and Administration

PART 1-SCOPE AND APPLICATION

SECTION 101 GENERAL

101.1 Title. These rules shall be known as the Michigan Building Code….

101.2 Scope: Essentially all construction

Exception: Detached one and two family dwellings, townhouses less than three stories.

101.4 Referenced codes: Fuel Gas; Mechanical; Plumbing; Property Maintenance; Fire Prevention; Energy; Appendices.

Chapter 27 Electrical: 2701 Scope. Electrical components, equipment and systems shall be designed and constructed in accordance with the Michigan electrical code. R 408.30448.

Scope and Administration

PART 2 – ADMINISTRATION AND ENFORCEMENT

KEY SECTIONS

- Building Department - Enforcement Agency
- Building Official – Duties & Power
- Permits, Fees, Inspections
- Licensed Design Professional
- Submittal Documents
- Certificate of Occupancy (C of O)
- Board of Appeals

Section 104
Duties and Powers of the Building Official

104.1 General. The *building official* is hereby authorized and directed to enforce the provisions of this code. The *building official* shall have the authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions.

Does Building Official have Final Say?

See Section 113 – Board of Appeals

CHAPTER 2
DEFINITIONS

"WHAT DO THE TERMS MEAN DEFINITIVELY?"

Definitions

- *Italicized terms have specific definitions*
- ***Always be mindful of specific 'definitions' and 'punctuation' – per IBC Commentary:***
  - "Codes are technical documents and every word, term and punctuation mark can impact the meaning of the code text and the intended results."

"Let's eat, Grandma."

Versus

"Let's eat Grandma."

CHAPTER 3
USE AND OCCUPANCY CLASSIFICATION

"WHAT CAN I DESIGN?"

What Are They Doing?

- Assembly
- Business
- Educational
- Factory
- High Hazard
- Institutional
- Mercantile
- Residential
- Storage
- Utility

…and When?

- Spaces with multiple uses must meet the requirements of all uses.
- A religious hall might be a day care during the week and a wedding reception venue on weekends. It might also occasionally host mercantile functions. The space must meet requirements of all occupancies.

Small Assembly Spaces

- 303.1.1 Small buildings and tenant spaces. A building or tenant space used for assembly purposes with an occupant load of less than 50 persons shall be classified as a Group B occupancy.
- Example:
  Small coffee shops

Small Assembly Spaces

303.1.2 Small assembly spaces.
The following rooms and spaces shall not be classified as Assembly occupancies:

1. A room or space used for assembly purposes with an occupant load of less than 50 persons and accessory to another occupancy shall be classified as a Group B occupancy or as part of that occupancy.

2. A room or space used for assembly purposes that is less 2 than 750 square feet (70 m in area and accessory to another occupancy shall be classified as a Group B occupancy or as part of that occupancy.

Small Assembly Spaces

303.1.3
Associated with Group E occupancies.

A room or space used for assembly purposes that is associated with a Group E occupancy is not considered a separate occupancy.

Must be ancillary and supportive of the Group E occupancy. These spaces must still comply with Assembly accessibility and egress requirements.

Small Education uses

305.2 Group E, day care facilities.
This group includes buildings and structures or portions thereof occupied by more 1 than five children older than 2 years of age who receive 2 educational, supervision or personal care services for fewer than 24 hours per day.

305.2.2 Five or fewer children.
A facility having five or fewer children receiving such day care shall be classified as part of the primary occupancy.

Small Storage uses

311.1.1 Accessory storage spaces.

A room or space used for storage purposes that is accessory to another occupancy shall be classified as part of that occupancy.

Small Storage uses

312.1 General. Buildings and structures of an accessory character and miscellaneous structures not classified in any specific occupancy shall be constructed, equipped and maintained to conform to the requirements of this code commensurate with the fire and life hazard incidental to their occupancy. Group U shall include, but not be limited to, the following: .....

In the commentary…. generally unoccupied structures

CHAPTER 4
SPECIAL DETAILED REQUIREMENTS BASED ON USE AND OCCUPANCY

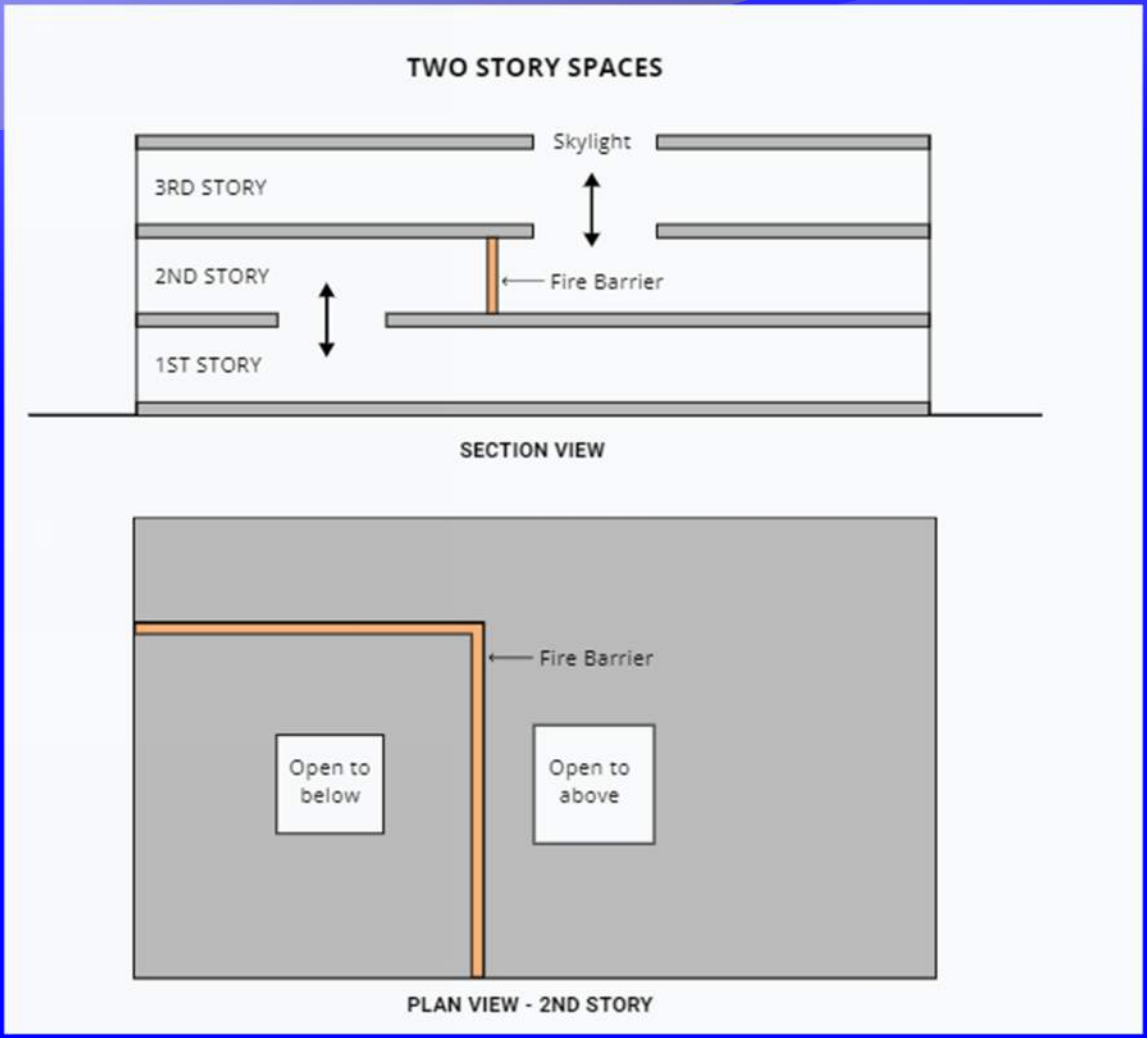
"WHAT UNIQUE CIRCUMSTANCES APPLY?"

Atriums

A space connecting 2 or more levels, generally speaking these spaces must comply either with:

Ch 4	Atriums
Ch 7	Vertical Openings
Ch 5	Mezzanines
Ch 5	Equipment Platforms

Vertical Openings



1. Does not connect more than two stories.
2. Does not penetrate a horizontal assembly that separates fire areas or smoke barriers that separate smoke compartments.
3. Is not concealed within the construction of a wall or a floor/ceiling assembly.
4. Is not open to a corridor in Group I and R occupancies.
5. Is not open to a corridor on non sprinklered floors.
6. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures.

CHAPTER 5
GENERAL BUILDING HEIGHTS AND AREAS

"HOW BIG CAN I DESIGN IT?"

Sections 503, 504, & 506
General Building Height and Area Limitations.

- Governed by Tables 504.3, 504.4, & 506.2 (2021 IBC)
- Based on Use Group and Type of Construction.
- Area: Gross building area per floor.
- Height: Level of fire fighter access to roof line – feet and stories.

2021 IBC Table 504.3:
Allowable Building Height in Feet Above Grade Plane

Occupancy Classification	TYPE OF CONSTRUCTION												
	See Footnotes	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	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

Read the Footnotes
Table is Abbreviated for Clarity

2021 IBC Table 504.4:
Allowable Number of Stories Above Grade Plane

Occupancy Classification	TYPE OF CONSTRUCTION												
	See Footnotes	TYPE I		TYPE II		TYPE III		TYPE IV				TYPE V	
		A	B	A	B	A	B	A	B	C	HT	A	B
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
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

Read the Footnotes
Table is Abbreviated for Clarity

2021 IBC Table 506.2:
Allowable Area Factor

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-2	NS	UL	UL	15,500	9,500	14,000	9,500	45,000	30,000	18,750	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	180,000	120,000	75,000	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	42,000	28,500	135,000	90,000	56,250	45,000	34,500	18,000
B	NS	UL	UL	37,500	23,000	28,500	19,000	108,00	72,000	45,000	36,000	18,000	9,000
	S1	UL	UL	150,000	92,000	114,000	76,000	432,000	288,000	180,000	144,000	72,000	36,000
	SM	UL	UL	112,500	69,000	85,500	57,000	324,000	216,000	135,000	108,000	54,000	27,000

Read the Footnotes
Table is Abbreviated for Clarity

"I Want it **BIGGER**!"

- The code loves sprinkler systems!
- Automatic sprinkler system increase: "Where a building is equipped throughout with an approved automatic sprinkler system in accordance with section 903.3.1.1…"

Section 504
Building Height (and increases)

Automatic Sprinkler System Increase

- Increase height by 20'
- Increase number of stories by one.

Section 506
Building Area Modifications

Automatic Sprinkler System Increase

- 200% Increase
- 300% Increase (One-story buildings)
- Exceptions for High Hazard occupancies.

Section 506
Building Area Modifications

Frontage Increase

- For buildings with more than 25% of its perimeter on a public way or open space of not less than 20 feet. Maximum 75% Increase
- Follow the calculation prescribed in the code.

Other Increases

- Fire Wall: (Chapter 7 and Section 510)
  - Creates two or more separate buildings. Each which can contain the maximum allowable area.
  - Must be free standing.
  - Limited openings allowed must be protected.
- Unlimited Area Buildings (Section 507)
  - Typical: One or two stories, fully fire suppressed and 60' yards or public ways on all sides.
  - Must still meet egress limits.
- Special Provisions (Section 510)
  - Parking garages with other uses.
- Mezzanines and Equipment Platforms (Section 505)

Section 507.4

No Sprinklers for Participant Sports Areas

Section 507.4
No Sprinklers for Participant Sports Areas

- **2021 IBC 507.4, Exception 2** allows no sprinklers for Group A (const type I, II, III, IV) or Groups B/F/M/S (any const type) to be one-story, unlimited area, no sprinklers at sport floor.
- Just confirm with AHJ on this "quid pro quo" if you accept the exception: ***Are you still considered a building "equipped throughout with an automatic sprinkler system"?***

Section 507.4
No Sprinklers for Participant Sports Areas

- Quiet changes occurred for A-3/A-4/A-5 bldgs related to this topic from 2006 to 2009 IBC…

2006 IBC

[F] 903.2.1.3 Group A-3. An automatic sprinkler system shall be provided for Group A-3 occupancies where one of the following conditions exists:

1. The fire area exceeds 12,000 square feet (1115 m^2).
2. The fire area has an occupant load of 300 or more.
3. The fire area is located on a floor other than the level of exit discharge.

Exception: Areas used exclusively as participant sports areas where the main floor area is located at the same level as the level of exit discharge of the main entrance and exit.

2009 IBC (2021 IBC same)

[F] 903.2.1.3 Group A-3. An *automatic sprinkler system* shall be provided for Group A-3 occupancies where one of the following conditions exists:

1. The *fire area* exceeds 12,000 square feet (1115 m^2);
2. The *fire area* has an *occupant load* of 300 or more; or
3. The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

Section 508
Mixed Use and Occupancy

- More than one occupancy group in a building.
- Three situations/Options
  - Accessory Occupancies
  - Non-separated Occupancies
  - Separated Occupancies

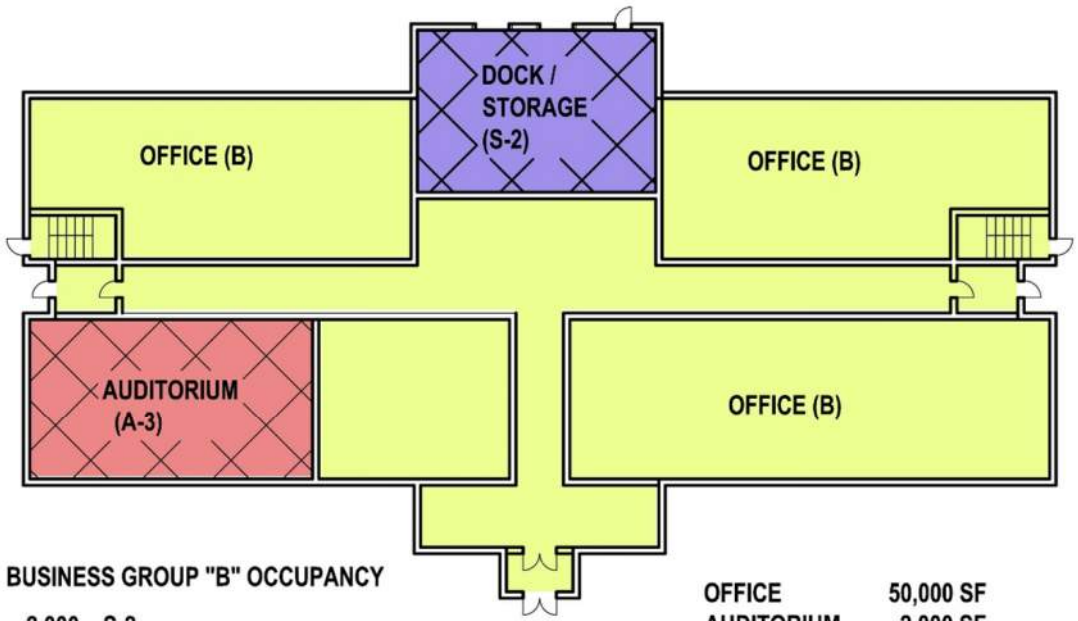
Accessory Occupancies

- Sum of all accessory occupancies are less than 10% of main occupancy area.
- No separation required.

Storage Room Note

- Storage rooms do not require separation or other special consideration if they serve the use of the space they are in. They are classified as part of the basic occupancy or use of the space.
- Example:
  - A storage room in gymnasium that only serves the gym need not have a fire rated enclosure.

Accessory Occupancy Example



BUSINESS GROUP "B" OCCUPANCY

2,000 S-2
+ 2,000 A-3

4,000 ACCESSORY
/ 54,000

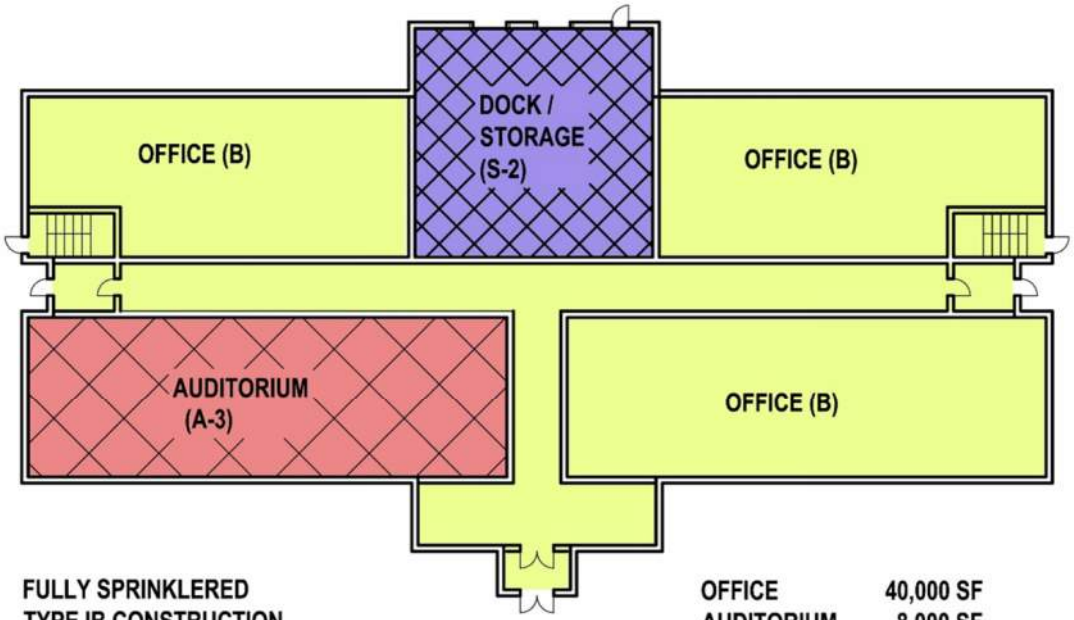
= 7.4% < 10%

OFFICE	50,000 SF
AUDITORIUM	2,000 SF
DOCK/STORAGE	2,000 SF
TOTAL	54,000 SF

Non-Separated Occupancies

- Allowable height and area based on the most restrictive occupancy group for type of construction.
- The requirements of this code shall apply to each portion of the building based on the occupancy classification of that space.
- Most restrictive egress requirements (Chapter 9) apply to total non-separated occupancy area.
- No separation required.

Non-Separated Occupancy Example



FULLY SPRINKLERED
TYPE IB CONSTRUCTION
3 STORIES (60')

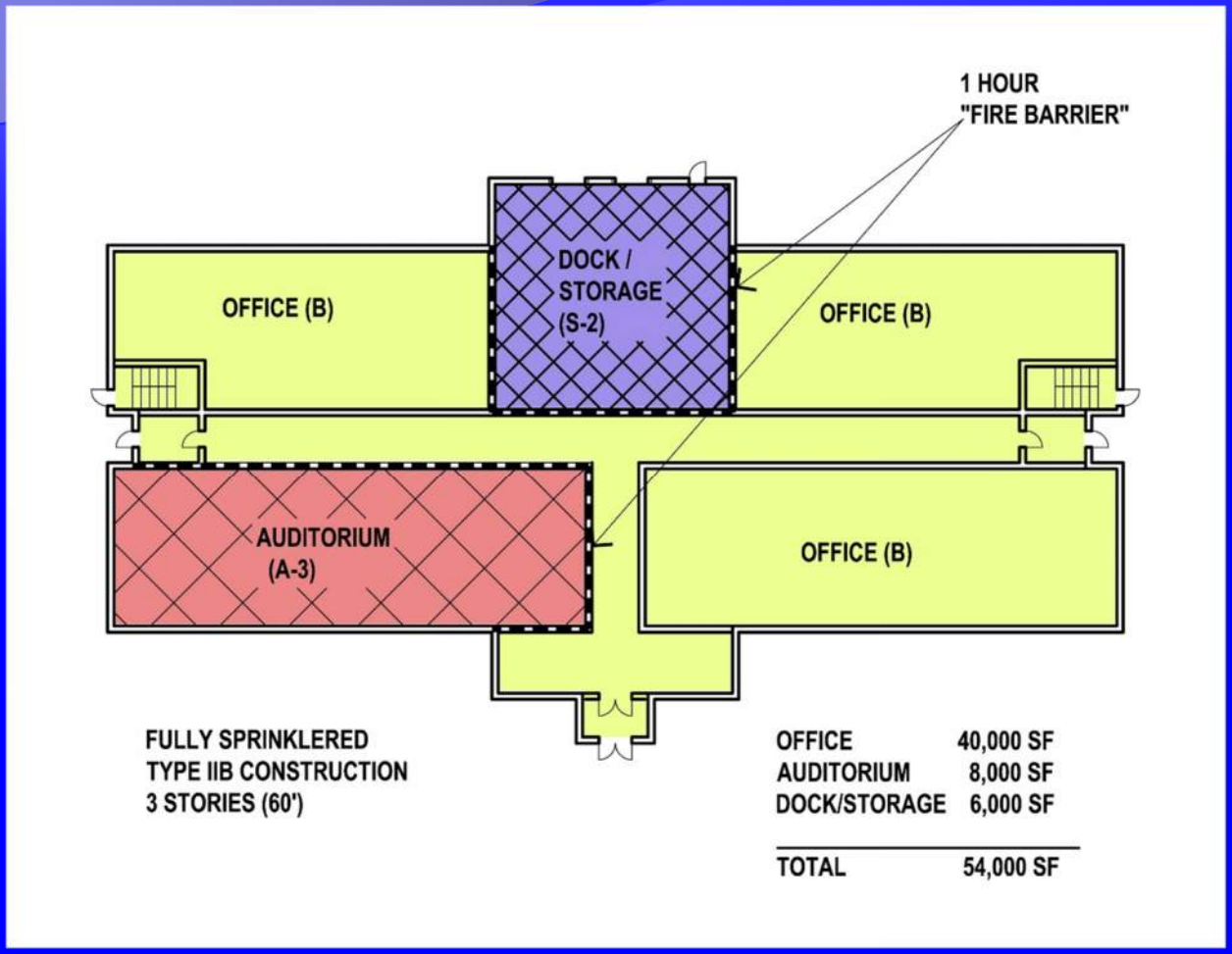
USE A-3 OCCUPANCY FOR HEIGHT & AREA
IT IS THE MOST RESTRICTIVE OF THE THREE.
TABLE 503: 11 STORIES, UNLIMITED AREA

OFFICE	40,000 SF
AUDITORIUM	8,000 SF
DOCK/STORAGE	6,000 SF
TOTAL	54,000 SF

Separated Occupancies

- Each area individually classified based on its occupancy and follows all code requirements for that occupancy.
- Allowable area in each story: sum of ratios of building area for each separated occupancy divided by allowable building area for each separated occupancy shall not exceed 1. The total of the ratios for all floors shall not exceed 3, 4 if fully sprinklered.
- Allowable height: Limited based on construction type for each separated occupancy.
- Separations ("Fire Barriers" and "Horizontal Assemblies") required per table 508.4

Separated Occupancies Example



Separated Occupancy Calculation

A-3 Occupancy: 8,000/28,500 = 0.28

B Occupancy: 40,000/69,000 = 0.57

S-2 Occupancy: 6,000/78,000 = 0.08

Total (Complies): 0.93 < 1.00

Table 508.4
Required Separation of Occupancies

OCCUPANCY	Ad, E		I-1, I-3, I-4		I-2		R		F-2, S-2, U		B, F-1, M, S-1	
	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS
A, E	N	N	1	2	2	NP	1	2	N	1	1	2
I-1, I-3, I-4	-	-	N	N	2	NP	1	NP	1	2	1	2
I-2	-	-	-	-	N	N	2	NP	2	NP	2	NP
R	-	-	-	-	-	-	N	N	1	2	1	2
F-2, S-2, U	-	-	-	-	-	-	-	-	N	N	1	2
B, F-1, M, S-1	-	-	-	-	-	-	-	-	-	-	N	N

Read the Footnotes
High Hazard Omitted for Clarity

Section 509, Table 509
Incidental Uses

- Incidental functions associated with a given occupancy that generally pose a greater level of risk to that occupancy."
- **Must be enclosed with fire barrier and fire-rated horizontal assembly, or a smoke-tight partition with fire suppression per Table 509.**
- Limited to 10% of building area on any floor.
- Examples: Some boiler rooms ,some furnace rooms, paint shops, labs, laundry rooms over 100 sf.

Beware!

- **Penthouses and Rooftop Structures:** These are covered in Section 1510 "Rooftop Structures".
  - Limited to one-third area of roof, 18-foot high and MEP/Shaft use limitation.
  - Otherwise, it is considered a floor.
- **Roof Decks**: Roof decks are not considered a story but may if they include a structure.

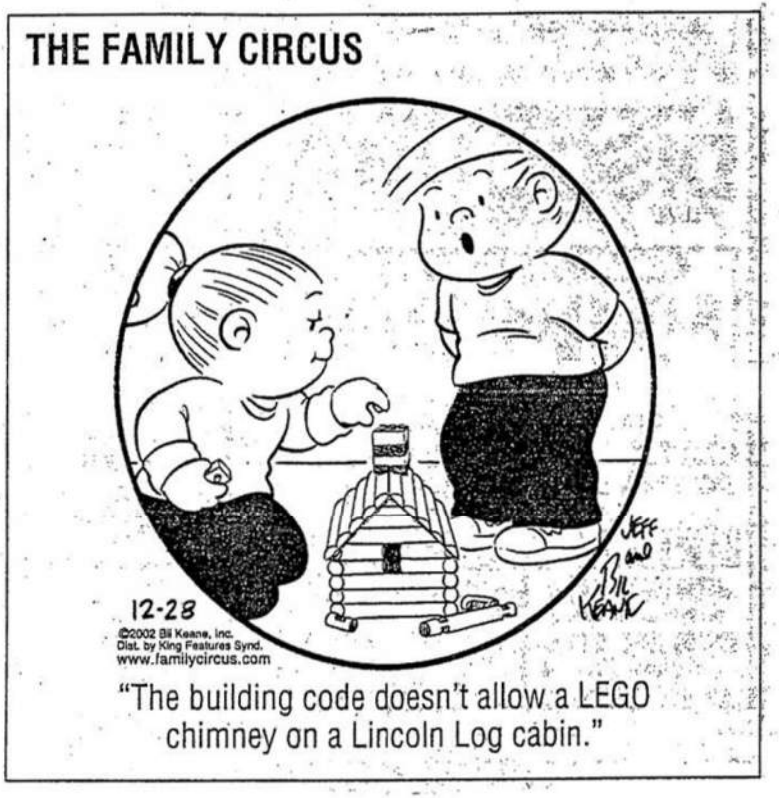
Beware!

- **Zoning Restrictions:**
  - Lot coverage limits, setbacks, height limits and other regulations limit height and area.

- Don't confuse "Fire Wall", with "Fire Barrier" or "Fire Partition". These are defined in Chapter 7.

CHAPTER 6
TYPES OF CONSTRUCTION

"WHAT IS IT MADE OF?"



ANOTHER EXAMPLE OF BUILDING CODES STIFLING CREATIVITY

Basic Concepts

- **Noncombustible Construction**
  - Defined by Code
  - Will not ignite or burn
  - Tested (ASTM)
  - Examples: Concrete, steel, masonry, stone, precast concrete
- **Combustible Construction**
  - NOT defined by Code
  - Examples: Wood, plastics, foam plastics……..

Basic Concepts

- "**Passive" Fire Protection**
  - Use of non-combustible construction
  - Protection by use of fire resistant enclosures such as gypsum board, fire-proofing, masonry, etc.

- "**Active" Fire Protection**
  - Fire suppression (sprinkler) systems

SECTION 602
Construction Classification

- Construction type is based on fire resistance of structural elements (columns, floors, roof and bearing walls).
- It's all about compliance with Table 601.

Five Construction Classifications

- Types I & II: Noncombustible materials
- Types III, IV (2021 IBC) & V: Mix of noncombustible materials and any material permitted by this code.

- Generally, the higher the classification, the larger the allowable area and taller the building height.
- Higher classifications generally require higher fire rated assemblies.

Type I & II Construction

- Noncombustible materials
- Examples:
  - Type IA, IB, IIA: Concrete structure or fireproofed “protected” steel or masonry.
  - Type IIB “Unprotected”: Steel

Type I Construction

Type II B Construction

(With fireproofing, could be Type IIA, IA or IB)

Type III Construction

- Exterior walls use noncombustible construction materials. Bearing walls are 2–hour fire rated.
- Interior elements are any material permitted by this code.
- Examples:
  - Exterior masonry bearing walls & steel frame.

Type III Construction

Type III Construction

2021 IBC Type IV Construction

- **Mass Timber**…primarily of solid, built-up, panelized or engineered wood products…
  - In the 2021 IBC Type IV Construction has been subdivided into four (4) sub-classifications, IV-A, IV-B, IV-C & IV-HT (original Type IV).
  - The minimum dimensions and permitted materials for building elements shall comply with the provisions of this section and Section 2304.11.
- **Type IV-A Construction**
  - Proposed with the intention of approximating the fire-resistance rating requirements of Type IA…all mass timber elements…are required to be fully covered by noncombustible protection…
  - Outside face of exterior walls…shall be protected with noncombustible protection with a minimum assigned time of 40 minutes.
  - Interior faces of all mass timber elements…shall be protected with materials complying with Section 703.3.
  - Additional items to be considered…protection time, floor & roof assembly, concealed spaces, shafts, etc.

2021 IBC Type IV Construction

- **Type IV-B Construction**
  - Approximates the fire-resistance-rating requirements of Type IB…less restrictive than Type IV-A construction, some of the mass timber elements…can be unprotected.
  - Un-protected structural elements are permitted but must meet required fire-resistance rating(s).
  - Outside face of exterior walls are similar to Type IV-A.
  - Interior faces of all mass timber elements are similar to Type IV-A.
  - Exposure Mass Timber Elements
    - Protection time, protected area, mixed unprotected areas and separation distance between unprotected mass timber all play into the percentage of mass timber that can be exposed to view.
  - Additional items to be considered…floor & roof assembly, concealed spaces, shafts, etc.

2021 IBC Type IV Construction

- **Type IV-C Construction**
  - Same fire-resistance rating as Type IV-B building elements…less noncombustible protection allowing for more exposed mass timber elements… which makes it similar to Type IV-HT in this aspect.
  - Outside face of exterior walls are similar to Types IV-A & IV-B.
  - Interior mass timber elements are allowed to be unprotected including floor & roof assemblies.
  - Concealed space & shaft requirements are less restrictive than Types IV-A & IV-B.

2021 IBC Type IV Construction

- **Type IV-HT (Heavy Timber) Construction**
  - Exterior walls are of noncombustible materials and the interior building elements are of solid wood, laminated heavy timber or structural composite lumber (SCL), without concealed spaces or with concealed spaces…
  - The minimum dimensions for permitted materials including solid timber, glued-laminated timber, SCL and cross-laminated timber (CLT) and the details of Type IV construction shall comply with the provisions of this section and Section 2304.11.
  - Concealed spaces are the most restrictive of all Type IV Construction and shall be protected.

2021 IBC Type IV Construction

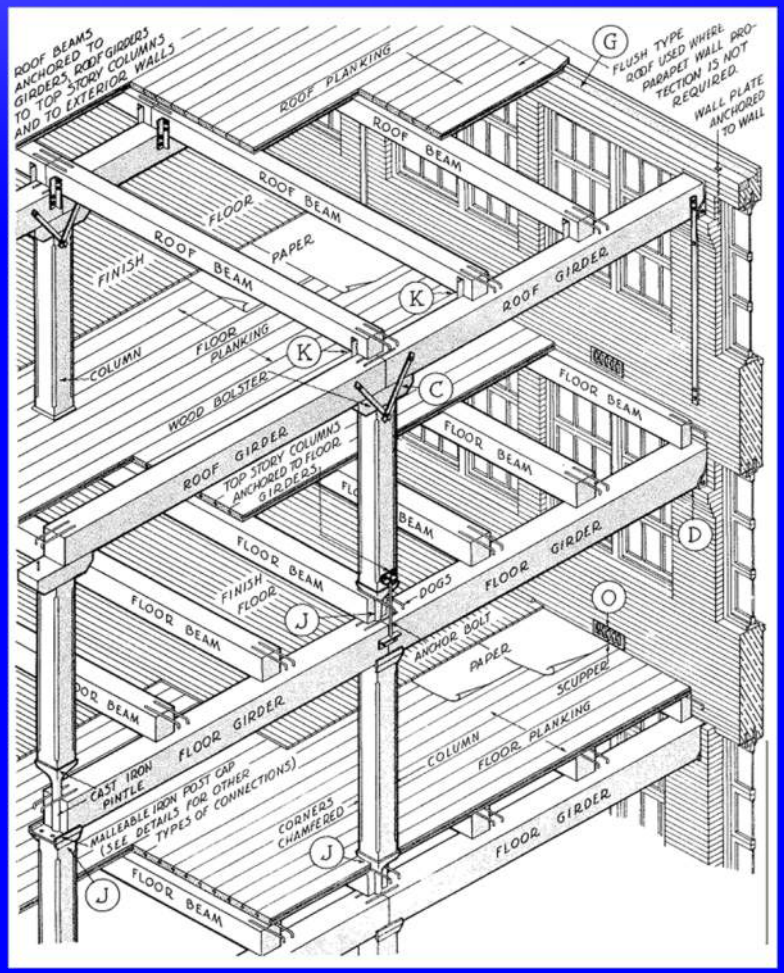
Mass Timber

Types IV-A, IV-B, IV-C

2021 IBC Type IV Construction

Heavy Timber

Types IV-HT



Type V Construction

- "Light wood framing"
- Exterior and interior elements are any materials permitted by this code.

Type V Construction

2021 IBC Table 601
Fire Rating of Structural Elements

- Provides fire-resistance rating requirements for building elements.
- Based on "hours" of protection.
- Building elements:
  - Primary structure
  - Bearing & nonbearing walls and partitions.
  - Floor construction
  - Roof construction

2021 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	B	A	B	A	B	C	HT	A	B
Primary Structural Frame (See Section 202)	3	2	1	0	1	0	3	2	2	HT	1	0
Bearing Walls Exterior Interior	 3 3	 2 2	 1 1	 0 0	 2 1	 2 0	 3 3	 2 2	 2 2	 2 1/HT	 1 1	 0 0
Nonbearing Walls and Partitions Exterior	See Table 705.5											
Nonbearing Walls and Partitions Interior	0	0	0	0	0	0	0	0	0	See Section 2304.11.2	0	0
Floor Construction and Secondary Members (See Section 202)	2	2	1	0	1	0	2	2	2	HT	1	0
Roof Construction and Secondary Members (See Section 202)	1½	1	1	0	1	0	1½	1	1	HT	1	0

Table 601

FRTW sentence at end of footnote 'b'

- *The FRTW allowance is **ONLY meant to afford leniency for non-comb Type I/II construction!***

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

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV				TYPE V	
	A	B	A	B	A	B	A	B	C	HT	A	B
Primary structural frame[f] (see Section 202)	3[a, b]	2[a, b, c]	1[b, c]	0[c]	1[b, c]	0	3[a]	2[a]	2[a]	HT	1[b, c]	0
Bearing walls												
Exterior[e, f]	3	2	1	0	2	2	3	2	2	2	1	0
Interior	3[a]	2[a]	1	0	1	0	3	2	2	1/HT[g]	1	0
Nonbearing walls and partitions Exterior	See Table 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)	$1^1/_2$[b]	1[b,c]	1[b,c]	0[c]	1[b,c]	0	$1^1/_2$	1	1	HT	1[b,c]	0

For SI: 1 foot = 304.8 mm.

a. Roof supports: Fire-resistance ratings of primary structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.

b. Except in Group F-1, H, M and S-1 occupancies, fire protection of structural members in roof construction shall not be required, including protection of primary structural frame members, roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant-treated wood members shall be allowed to be used for such unprotected members.

Table 601

FRTW sentence at end of footnote 'b'

- *The FRTW allowance is **NOT also intended to require FRTW in comb const (Type IIIA and VA)!***

In buildings of Type I or II construction, fire-retardant-treated wood (FRTW) may be utilized for unprotected roof members. Please note that FRTW is not required in the roof of buildings of Type IIIA or VA construction since combustible materials are already permitted by Sections 602.3 and 602.5, respectively.

Important Note

- You can always use a more fire resistant construction, but classify your building as a lower construction type on your drawings.
- Example: Use a fireproofed steel frame (Type IIA) construction but classify your building as Type IIIB.
- It's all about compliance with Table 601 and how you identify it on your drawings.

SECTION 603
Combustible Materials in Type I & II Construction

- Some combustible materials are allowed in Type I and II "Noncombustible" construction as outlined and controlled in this section.
- Examples:
  - Wood Blocking & Trim
  - Stages
  - Insulation
  - Plastics
  - Foam Plastics
  - Electrical Wiring

CHAPTER 7
FIRE & SMOKE PROTECTION FEATURES

"PASSIVE" FIRE PROTECTION

Passive Fire Protection

- **Chapter 7** defines the passive methods for providing fire-resistive construction to ensure life safety by protecting structural elements and providing horizontal and vertical barriers limiting the passage of fire and smoke. This allows time for the evacuation of the building, allows for fire fighter access and helps limit damage.
- Fire resistive construction is rated by time (hours) and is based on actual testing or by calculation.
  - Testing organizations include ASTM International and Underwriters Laboratories (UL).
  - Restrained versus unrestrained assemblies are identified. The latter rating is more commonly used due to complexity of restrained assemblies.
- Common fire-resistive, non-combustible materials include concrete, masonry, spray-applied fireproofing and intumescent fireproofing. Gypsum Board is considered semi non-combustible.
- The code allows tradeoffs between passive and active systems.

Passive Fire Protection

Attention to detail in Design, Construction and Re-Construction is critical.

- **Keys to Success:**
  - Continuity, where required
  - Structural Stability
  - Complete Barriers / Enclosures
  - Firestopping
  - Fire & Smoke Damper Coordination

Fire/Smoke Walls, Barriers and Partitions

Fire Wall (706)

- A Fire Wall is an area separation
- Creates separate buildings.
- Self supporting. Limited protected openings. Typical 2, 3, & 4 hour ratings. In some cases these extend through roof and exterior walls.

Fire Barrier (707)

- A Fire Barrier is an occupancy separation.
- Separates occupancies and exits
- 1 to 4 hour ratings
- "Continuity" Required – the supporting structure must have the same rating as the partition.

Fire/Smoke Walls, Barriers and Partitions

Fire Partition (708)

- Special uses: Walls between tenant spaces; Corridor walls (un-sprinklered buildings); Walls between dwelling units or sleeping units; Elevator Lobbies.
- Typically 1 hour.

Smoke Barrier (709)

- Restrict migration of smoke (Typical in I-2 and I-3 occupancies only).
- 1-hour fire rated with twenty minute openings.

Smoke Partition (710)

- Restrict migration of smoke; non-rated; self-closing, smoke sealed door.

Fire/Smoke Walls, Barriers and Partitions

Floor & Roof Assemblies (711)

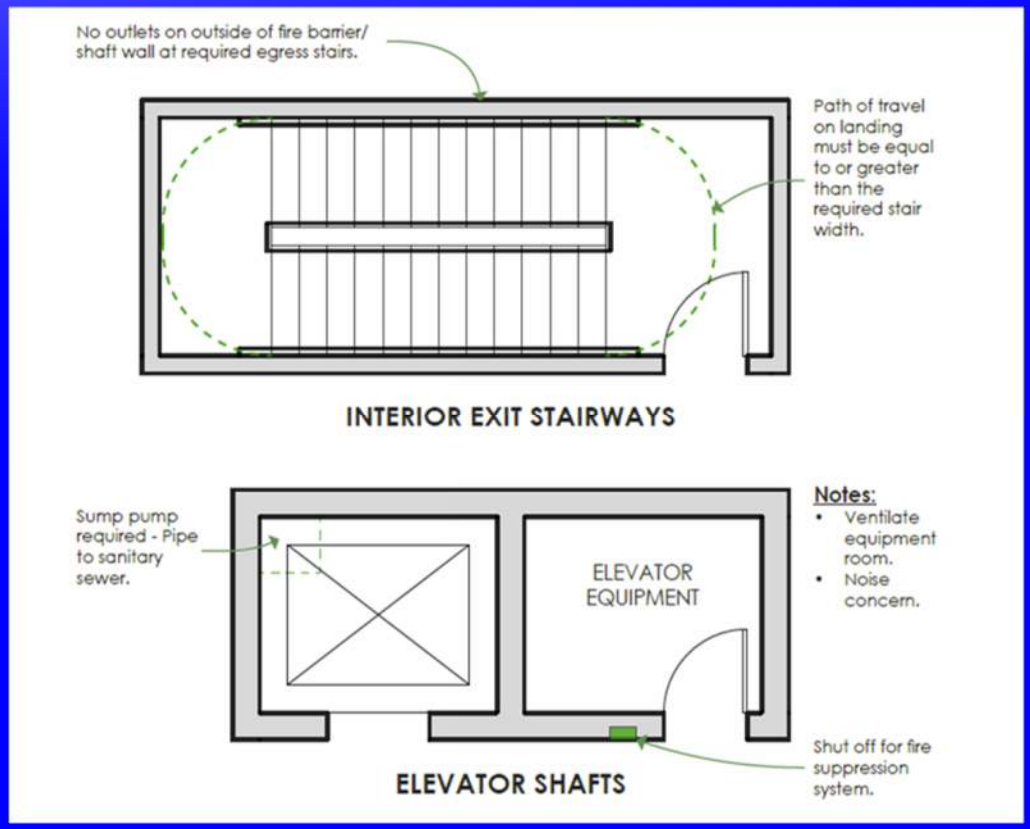
- Floor and roof structures may by required to have a rating based on use and construction type.

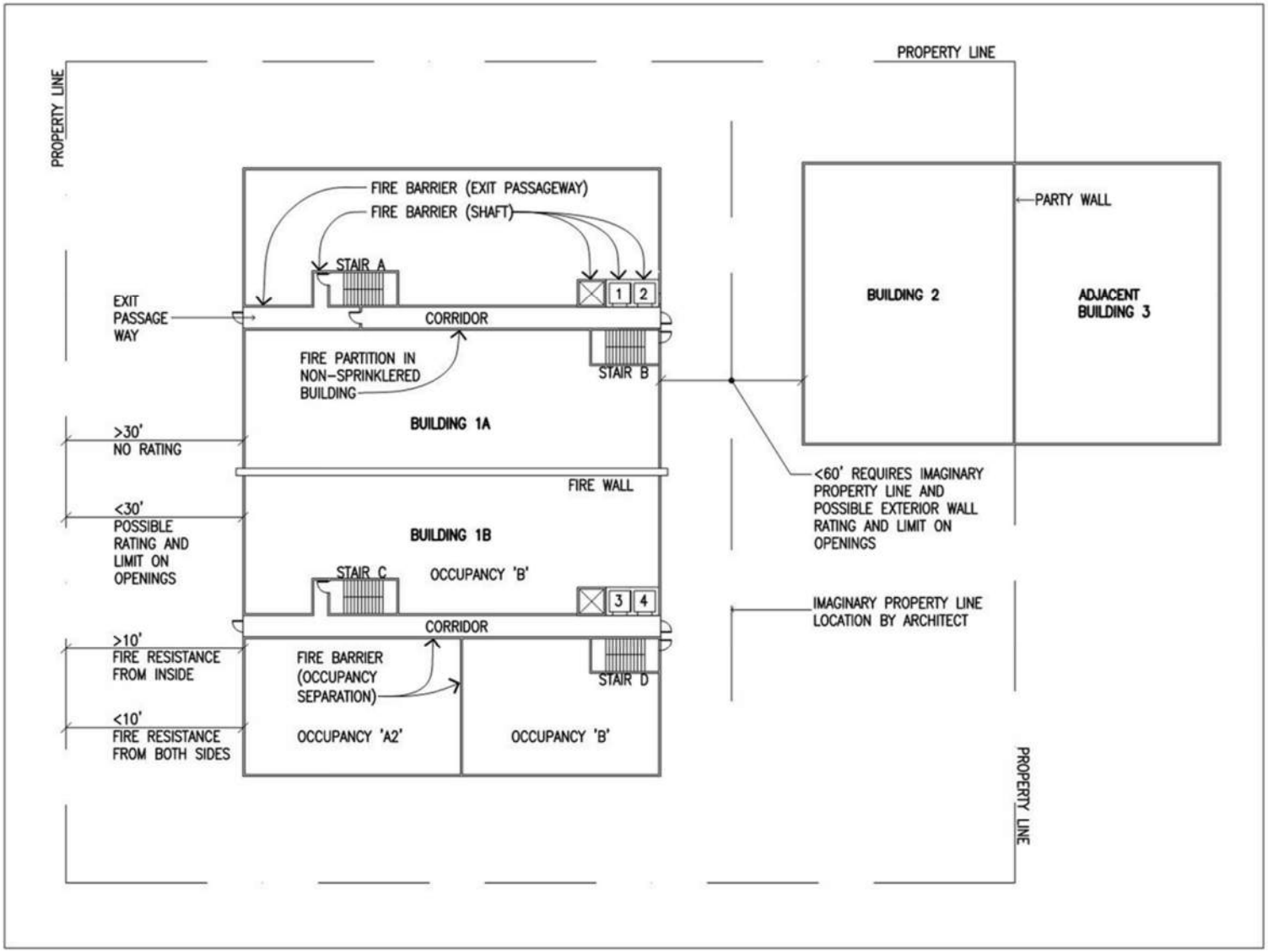
Shaft and Vertical Exit Enclosures (713)

- Shaft: Enclosed opening through multiple floors. Shafts must have a singular use (mechanical, exit stair, elevator, etc.)
- 1-hour fire-rated if connecting 3 or fewer floors. 2-hour rated if connecting 4 or more floors.
- Top and bottom of shafts need to be enclosed and fire-rated except at S.O.G. and roof.
- Mechanical shafts can be open to a mechanical room if the room has the same rating.

"Sacred Spaces"

- Nothing allowed in, or through, elevator shafts and equipment rooms, unless it serves that space.
- Not to be used for any other purpose.
- Fire-rated enclosures (1-hour for up to 3 floors, 2-hour for 4 or more floors).
- Continuity – supporting structure must have the same fire rating as the shaft.
- Smoke and fire rated enclosure.




PROPERTY LINE
PROPERTY LINE
FIRE BARRIER (EXIT PASSAGEWAY)
FIRE BARRIER (SHAFT)
STAIR A
1
2
EXIT PASSAGE WAY
CORRIDOR
FIRE PARTITION IN NON-SPRINKLERED BUILDING
STAIR B
BUILDING 1A
>30' NO RATING
FIRE WALL
<30' POSSIBLE RATING AND LIMIT ON OPENINGS
BUILDING 1B
STAIR C
OCCUPANCY 'B'
3
4
CORRIDOR
>10' FIRE RESISTANCE FROM INSIDE
FIRE BARRIER (OCCUPANCY SEPARATION)
STAIR D
<10' FIRE RESISTANCE FROM BOTH SIDES
OCCUPANCY 'A2'
OCCUPANCY 'B'
PROPERTY LINE
PARTY WALL
BUILDING 2
ADJACENT BUILDING 3
<60' REQUIRES IMAGINARY PROPERTY LINE AND POSSIBLE EXTERIOR WALL RATING AND LIMIT ON OPENINGS
IMAGINARY PROPERTY LINE LOCATION BY ARCHITECT

Fire/Smoke Walls/Barriers & Partitions

- "Continuous" – Fire partition, shaft enclosure fire partition, smoke barrier and smoke partition must be continuous from deck to deck
- "Continuity" – Supporting structure must match fire rating of fire barrier, shaft enclosure, and smoke barrier.

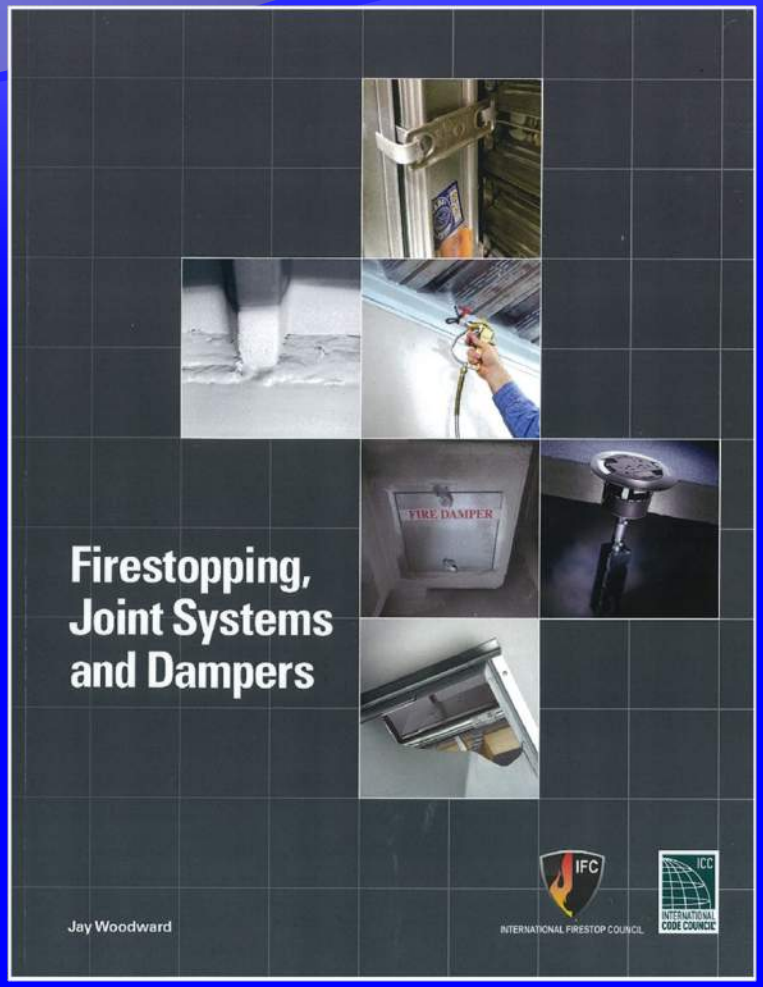
Fire & Smoke Dampers

- Dampers required in ductwork if over 1-hour rated. Dampers required in RA and air transfer openings.
- Fire dampers, smoke dampers and fire/smoke dampers are different assemblies.

Fire & Smoke Damper Locations

SECTION	WALL TYPE	REFERENCED FROM	TYPE OF DAMPER
717.5.1 (IMC 607.5.1)	Fire Walls	706.11	Fire Damper
717.5.1.1 (IMC 607.5.1.1)	Fire Wall – Horizontal Exits	706.11	Fire Damper, Smoke Damper
717.5.2 (IMC 607.5.2)	Fire Barriers	707.10	Fire Damper
717.5.2.1 (IMC 607.5.2.1)	Fire Barriers – Horizontal Exits	707.10	Fire Damper, Smoke Damper
717.5.3 (IMC 607.5.5)	Shaft Enclosures	713.10	Fire Damper, Smoke Damper
717.5.4 (IMC 607.5.3)	Fire Partitions	708.9	Fire Damper
717.5.4.1 (IMC 607.5.3 and 607.5.4)	Fire Partitions – Corridors	708.9	Fire Damper, Smoke Damper
717.5.5 (IMC 607.5.4)	Smoke Barriers	709.8	Smoke Damper
717.5.6 (IMC 607.5.6)	Exterior Walls	705.10	Fire Damper
717.5.7 (IMC 607.5.7)	Smoke Partitions	710.8	Smoke Damper

Firestopping, Joint Systems and Dampers



Penetrations and Joint Protection (714, 715) "Firestopping"

- Penetrations and joints in fire or smoke rated construction must be protected.
  - Through penetration and membrane penetration. F-rating and T-rating.
- Firestopping systems per Underwriters Laboratories (U.L.).
- Building perimeter joints, even in non-rated construction, must be sealed.
- At curtainwalls, joint construction extends between horizontal mullions.

Section 711.2.4.3
Exception for ½-Hour Floor if NFPA 13

- *Is there an intent to limit use of the exception to ONLY floors between dwelling and/or sleeping units even if an Owner decides to trade up their sprinkler system?*

420.3 Horizontal separation. Floor assemblies separating *dwelling units* in the same buildings, floor assemblies separating *sleeping units* in the same building and floor assemblies separating dwelling or *sleeping units* from other occupancies contiguous to them in the same building shall be constructed as *horizontal assemblies* in accordance with Section 711.

711.2.4.3 Dwelling units and sleeping units. *Horizontal assemblies* serving as *dwelling or sleeping unit* separations in accordance with Section 420.3 shall be not less than 1-hour *fire-resistance-rated* construction.

Exception: *Horizontal assemblies* separating *dwelling units* and *sleeping units* shall be not less than $^{1}/_{2}$-hour fire-resistance-rated construction in a building of Types IIB, IIIB and VB construction, where the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

Section 711.2.4.3
Exception for ½-Hour Floor if NFPA 13

- **ICC says "Not limited", *but check w/ your AHJ***

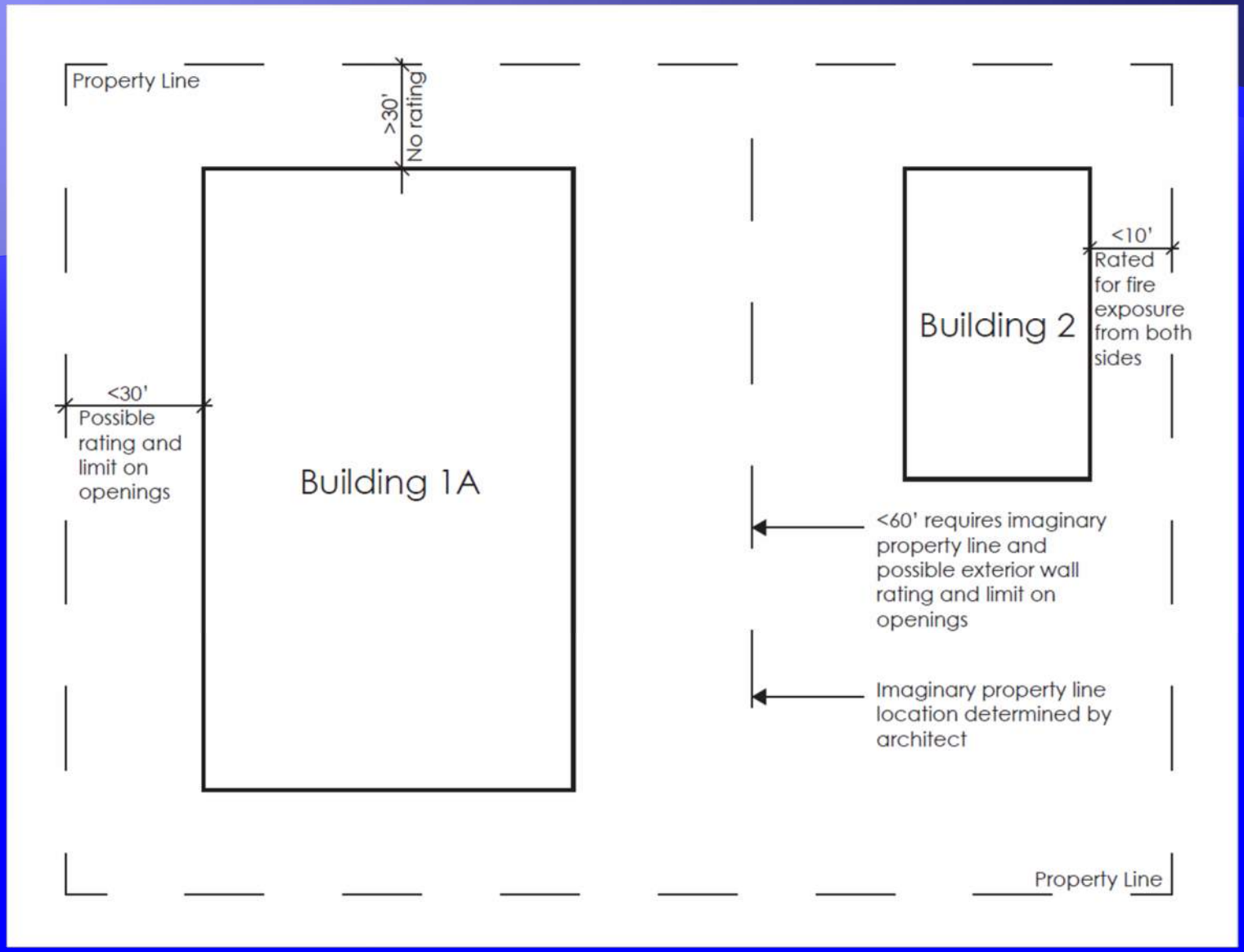
In general, the intent of Section 711.2.4.3 is that all horizontal assemblies serving as dwelling or sleeping unit separations are separating dwelling units or sleeping units from each other as well as from other occupancies as stipulated in Section 420.3 (Question #1). As such, the Exception in Section 711.2.4.3 is not limited, in my opinion, to horizontal assemblies separating dwelling units and sleeping units from each other but would also be applicable to horizontal assemblies separating dwelling units or sleeping units from other occupancies.

711.2.4.3 Dwelling units and sleeping units. *Horizontal assemblies* serving as *dwelling or sleeping unit* separations in accordance with Section 420.3 shall be not less than 1-hour *fire-resistance-rated* construction.

Exception: *Horizontal assemblies* ~~separating~~ *~~dwelling units~~* and *~~sleeping units~~* shall be not less than $^{1}/_{2}$-hour fire-resistance-rated construction in a building of Types IIB, IIIB and VB construction, where the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

Exterior Walls, Windows, and Doors

- Rating requirements are in Section 705.
  - For walls within 30’ of the property line.
- Buildings on the same lot are also controlled by Section 705.
  - Imaginary property line required between them to determine requirements.


Property Line
>30'
No rating
<30'
Possible rating and limit on openings
Building 1A
Building 2
<10'
Rated for fire exposure from both sides
<60' requires imaginary property line and possible exterior wall rating and limit on openings
Imaginary property line location determined by architect
Property Line

'Old' Table 602 (now 705.5 in 2021 IBC) Applying Fire Separation Distance (FSD)

- *Similar to frontage increases via 'W',* ***it is measured 'perpendicular' to exterior walls…***

[BF] FIRE SEPARATION DISTANCE. The distance measured from the building face to one of the following:

1. The closest interior *lot line*.
2. To the centerline of a street, an alley or *public way*.
3. To an imaginary line between two buildings on the lot.

The distance shall be measured at right angles from the face of the wall.

Table 705.5 in 2021 IBC

TABLE 602

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

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

Table 602

Applying Fire Separation Distance (FSD)

- *Although using the same measuring tool (FSD), remember there are differences between:*
  - ***1) Exterior Wall Rating***
  - ***2) SF of Openings***
  - ***3) Protection of Openings***

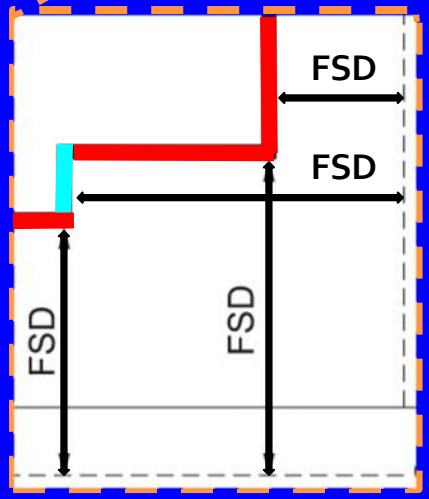


TABLE 705.8
MAXIMUM AREA OF EXTERIOR WALL OPENINGS BASED ON FIRE SEPARATION DISTANCE AND DEGREE OF OPENING PROTECTION

FIRE SEPARATION DISTANCE (feet)	DEGREE OF OPENING PROTECTION	ALLOWABLE AREA[a]
0 to less than 3[b, c, k]	Unprotected, Nonsprinklered (UP, NS)	Not Permitted[k]
	Unprotected, Sprinklered (UP, S)[i]	Not Permitted[k]
	Protected (P)	Not Permitted[k]
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, j]	Unprotected, Nonsprinklered (UP, NS)	10%[h]
	Unprotected, Sprinklered (UP, S)[i]	25%
	Protected (P)	25%

CHAPTER 8
INTERIOR FINISHES

"ARE THERE LIMITS ON INTERIOR MATERIALS?"

SECTION 805 COMBUSTIBLE MATERIALS IN TYPES I AND II CONSTRUCTION

805.1 Application.

Combustible materials installed on or in floors of buildings of Type I or II construction shall comply with Sections 805.1 through 805.1.3. Exception:

1. *Stages* and *platforms* constructed in accordance with Sections 410.2 and 410.3, respectively.

SECTION 805 COMBUSTIBLE MATERIALS IN TYPES I AND II CONSTRUCTION

805.1.1 Subfloor construction.

Floor sleepers, bucks and nailing blocks shall not be constructed of combustible materials, unless the space between the fire-resistance-rated floor assembly and flooring is either solidly filled with noncombustible materials or fireblocked in accordance with Section 718, and provided that such open spaces shall not extend under or through permanent partitions or walls.

SECTION 805 COMBUSTIBLE MATERIALS IN TYPES I AND II CONSTRUCTION

805.1.2 Wood finish flooring.

wood finish flooring is permitted to be attached directly to the embedded or fireblocked wood sleepers and shall be permitted where cemented directly to the top surface of fire-resistance-rated floor assemblies or directly to a wood subfloor attached to sleepers as provided for in Section 805.1.1.

SECTION 805 COMBUSTIBLE MATERIALS IN TYPES I AND II CONSTRUCTION

805.1.3 Insulating Boards.

Combustible insulating boards not more than ½ inch thick and covered with finish flooring are permitted where attached directly to noncombusible floor assembly or to wood subflooring attached to sleepers as provided for in Section 805.1.1.

REMEMBER? Section 603

SECTION 603
COMBUSTIBLE MATERIAL IN TYPES I AND II CONSTRUCTION

603.1 Allowable materials.

Combustible materials shall be permitted in buildings of Type I or II construction in the following applications and in accordance with Sections 603.1.1 through 603.1.3:

1. *Fire-retardant-treated wood* shall be permitted in:
   1.1. Nonbearing partitions where the required *fire-resistance rating* is 2 hours or less except in *shaft enclosures* within Group I-2 occupancies and *ambulatory care facilities* .
   1.2. Nonbearing *exterior walls* where fire-resistance-rated construction is not required.
   1.3. Roof construction, including girders, trusses, framing and decking.

   Exceptions:

   1. In buildings of Type IA construction exceeding two *stories above grade plane*, *fire-retardant-treated wood* is not permitted in roof construction where the vertical distance from the upper floor to the roof is less than 20 feet (6096 mm).
   2. Group I-2, roof construction containing *fire-retardant-treated wood* shall be covered by not less than a Class A *roof covering* or roof assembly, and the roof assembly shall have a *fire-resistance rating* where required by the construction type.

   1.4. Balconies, porches, decks and exterior *stairways* not used as required exits on buildings three *stories* or less above grade plane.
2. Thermal and acoustical insulation, other than foam plastics, having a *flame spread index* of not more than 25.

   Exceptions:

   1. Insulation placed between two layers of noncombustible materials without an intervening airspace shall be allowed to have a *flame spread index* of not more than 100.
   2. Insulation installed between a finished floor and solid decking without intervening airspace shall be allowed to have a *flame spread index* of not more than 200.

REMEMBER? Section 603

3. Foam plastics in accordance with Chapter 26.
4. *Roof coverings* that have an A, B or C classification.
5. *Interior floor finish* and floor covering materials installed in accordance with Section 804.
6. Millwork such as doors, door frames, window sashes and frames.
7. *Interior wall and ceiling finishes* installed in accordance with Section 803.
8. *Trim* installed in accordance with Section 806.
9. Where not installed greater than 15 feet (4572 mm) above grade, show windows, nailing or furring strips and wooden bulkheads below show windows, including their frames, aprons and show cases.
10. Finish flooring installed in accordance with Section 805.
11. Partitions dividing portions of stores, offices or similar places occupied by one tenant only and that do not establish a *corridor* serving an *occupant load* of 30 or more shall be permitted to be constructed of *fire-retardant-treated* wood, 1-hour fire-resistance-rated construction or of wood panels or similar light construction up to 6 feet (1829 mm) in height.
12. *Stages* and *platforms* constructed in accordance with Sections 410.2 and 410.3, respectively.
13. Combustible *exterior wall coverings*, balconies and similar projections and bay or oriel windows in accordance with Chapter 14 and Section 705.2.3.1.
14. Blocking such as for handrails, millwork, cabinets and window and door frames.
15. Light-transmitting plastics as permitted by Chapter 26.
16. Mastics and caulking materials applied to provide flexible seals between components of *exterior wall* construction.
17. Exterior plastic *veneer* installed in accordance with Section 2605.2.
18. Nailing or furring strips as permitted by Section 803.15.
19. Heavy timber as permitted by Note c to Table 601 and Sections 602.4.4.4 and 705.2.3.1.
20. Aggregates, component materials and admixtures as permitted by Section 703.2.1.2.
21. Sprayed fire-resistant materials and intumescent and mastic fire-resistant coatings, determined on the basis of *fire resistance* tests in accordance with Section 703.2 and installed in accordance with Sections 1705.15 and 1705.16, respectively.
22. Materials used to protect penetrations in fire-resistance-rated assemblies in accordance with Section 714.
23. Materials used to protect *joints* in fire-resistance-rated assemblies in accordance with Section 715.
24. Materials allowed in the concealed spaces of buildings of Types I and II construction in accordance with Section 718.5.
25. Materials exposed within plenums complying with Section 602 of the *International Mechanical Code*.
26. Wall construction of freezers and coolers of less than 1,000 square feet (92.9 m^2), in size, lined on both sides with noncombustible materials and the building is protected throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
27. Wood nailers for parapet flashing and roof cants.

SECTION 603 COMBUSTIBLE MATERIALS IN TYPES I AND II CONSTRUCTION

Note that these listed allowed combustible materials refer to this Chapter 8:

603.1 (5) *Interior Floor finish* and floor covering materials in accordance with Section 804.

603.1 (7) *Interior wall* and *ceiling finishes* installed in accordance with Section 803 Wall and Ceiling finishes.

603.1 (8) *Trim* installed in accordance with Section 806 Decorative Materials and Trim.

603.1 (10) Finish flooring installed in accordance with Section 805 Combustible Materials in Types I and II Construction

SECTION 2303.2 FIRE-RETARDANT-TREATED WOOD

Fire-retardant is not noncombustible. Therefore fire-retardant wood construction in Types I and II Construction is still limited to Section 603 and Table 601 footnote b.

Section 2303.2.9 Type I and II construction applications.

See Section 603.1 for limitations on the use of *fire-retardant-treated wood* in buildings of Type I and II construction.

CHAPTER 9
FIRE PROTECTION SYSTEMS

"ACTIVE" FIRE PROTECTION

The Code Loves Sprinkler Systems

- The Code provides many exceptions and advantages for buildings –

  "equipped throughout with an approved automatic sprinkler system…"

- The building must be fully fire suppressed to gain the code advantages.

Fire Suppression (Sprinkler) Systems

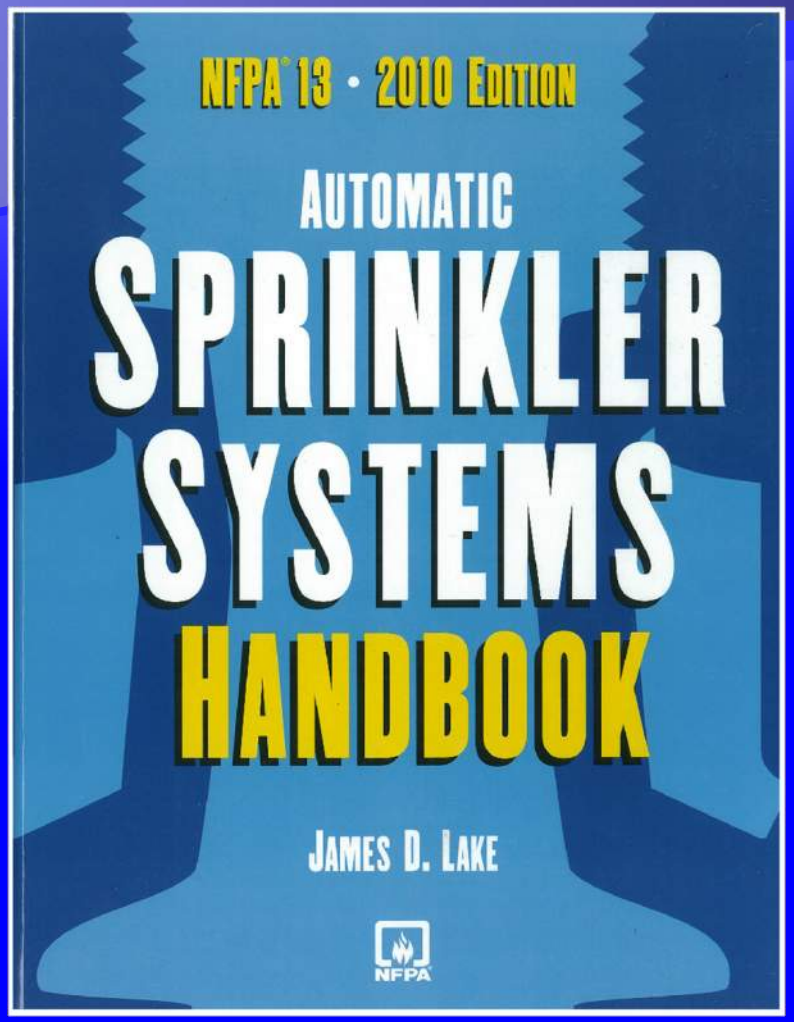
- Required in certain occupancies where floor area and/or occupant loads exceed a set limit
  - A, E, H, M, R, S Occupancies
  - Example

903.2.1.2 Group A-2. An *automatic sprinkler system* shall be provided for *fire areas* containing Group A-2 occupancies and intervening floors of the building where one of the following conditions exists:

1. The *fire area* exceeds 5,000 square feet (464.5 m^2)
2. The *fire area* has an occupant load of 100 or more.
3. The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

Sprinkler System Notes

- A separate water supply/main is required to serve a sprinkler system. (Allows municipality to shut off domestic water, but main fire suppression system).
- Fire Department connection (FDC)
  - Sometimes referred to as "Siamese Connection".
  - On building or remote
  - Must be in close to proximity to fire hydrant (verify distance with local Fire Marshal).
  - Fire Marshall must approve location.
  - Locate 18" to 48" above grade.
  - Unobstructed access.
  - Alarm bell and light over head.
- Test Head
  - Be careful in locating test head on exterior of building due to extreme water flor during a test.
  - Construction documents and shop drawings must be submitted to AHJ.


NFPA® 13 • 2010 EDITION
AUTOMATIC
SPRINKLER
SYSTEMS
HANDBOOK
JAMES D. LAKE
NFPA

Standpipes

- **Regulated by NFPA 14**
- **Where Required:**
  - Buildings more than 30’ above or below the level of fire department access.
  - Occupancy Group A over 1000 occupants.
  - Malls
  - Rooftop Gardens
  - Helistops and Heliports
  - Marinas & Boatwells
- **One standpipe required on roof level, unless roof is pitched at 4:12 or steeper.**

Standpipe Types

- **Wet**
  - Typical
- **Dry**
  - At areas subject to freezing
  - Example: Open parking decks.
- **Classifications**
  - Class I
  - Class II
  - Class III

Standpipe Classifications

- The specific type of system is based on the occupancy classification and building height.
  - **Class I** standpipes serve a 2.5-inch fire hose connection for fire department use.
  - **Class II** standpipes serve a 1.5-inch fire hose connection and are typically found in cabinets. These are intended for trained occupant use and are spaced according to the hose length.
  - **Class III** standpipes have both connections of Class I and II. Many times these connections will include a 2.5-inch reducer to a 1.5-inch connection.

Standpipe Notes

- Spacing is based on fire hose length to most remote area of the floor.
  - 150' (non-sprinklered)
  - 200' (sprinklered)
- Typically located in stairwells, outside the egress path
  - Locate on intermediate landing
  - Sometimes allowed or required on the floor landing.
  - Confirm with Fire Marshal.
  - Elevators that have sprinklers require a shut off valve at the egress floor.

Fire Command Center

- Required for high-rise buildings.
- Location must be approved by the AHJ (Authority Having Jurisdiction).
- The room must be enclosed by a 1-hour fire barrier and 1-hour fire rated horizontal assemblies.
- Room must be 200 SF, minimum with minimum dimension of 10 Feet.
  - Layout of room and all equipment, monitors, controls, etc. Must be approved by the AHJ.
  - Work table required for building drawings
  - Bookcase recommended for equipment manuals.

Required Features for Fire Command Center

1. The emergency voice/alarm communication system control unit.
2. The Fire Department communications system.
3. Fire detection and alarm system annunciator.
4. Annunciator unit visually indicating the location of the elevators and whether they are operational.
5. Status indicators and controls for air distribution systems.
6. The fire fighter's control panel.
7. Controls for unlocking interior exit stairway doors simultaneously.
8. Sprinkler valve and waterflow detector display panels.
9. Emergency and standby power status indicators.
10. A telephone for Fire Department use.
11. Fire Pump status indicators.
12. Schematic building plans.

Required Features for Fire Command Center

13. An approved Building Information card that contains, but is not limited to, the following information:
    - 13.1. General building information that includes: property name, address, the number of floors in the building above and below grade, use and occupancy classification, etc.
    - 13.2. Building emergency contact information.
    - 13.3. Building construction information that includes: the type of building construction including but not limited to floors, walls, columns, and roof assembly.
    - 13.4. Exit access and exit stairway information.
    - 13.5. Building services and system information.
    - 13.6. Fire protection system information.
    - 13.7. Hazardous material information.

Required Features for Fire Command Center

14. Work table.
15. Generator supervision devices, manual start and transfer features.
16. Public address system, where specifically required by other sections of this code.
17. Elevator fire recall switch in accordance with ASME A17.1/BSA 44.
18. Elevator emergency or standby power selector switch(es), where emergency or standby power is provided.

CHAPTER 10
MEANS OF EGRESS

"GETTING OUT SAFELY"

1004 Occupant Load

Note: Net area vs Gross Area!

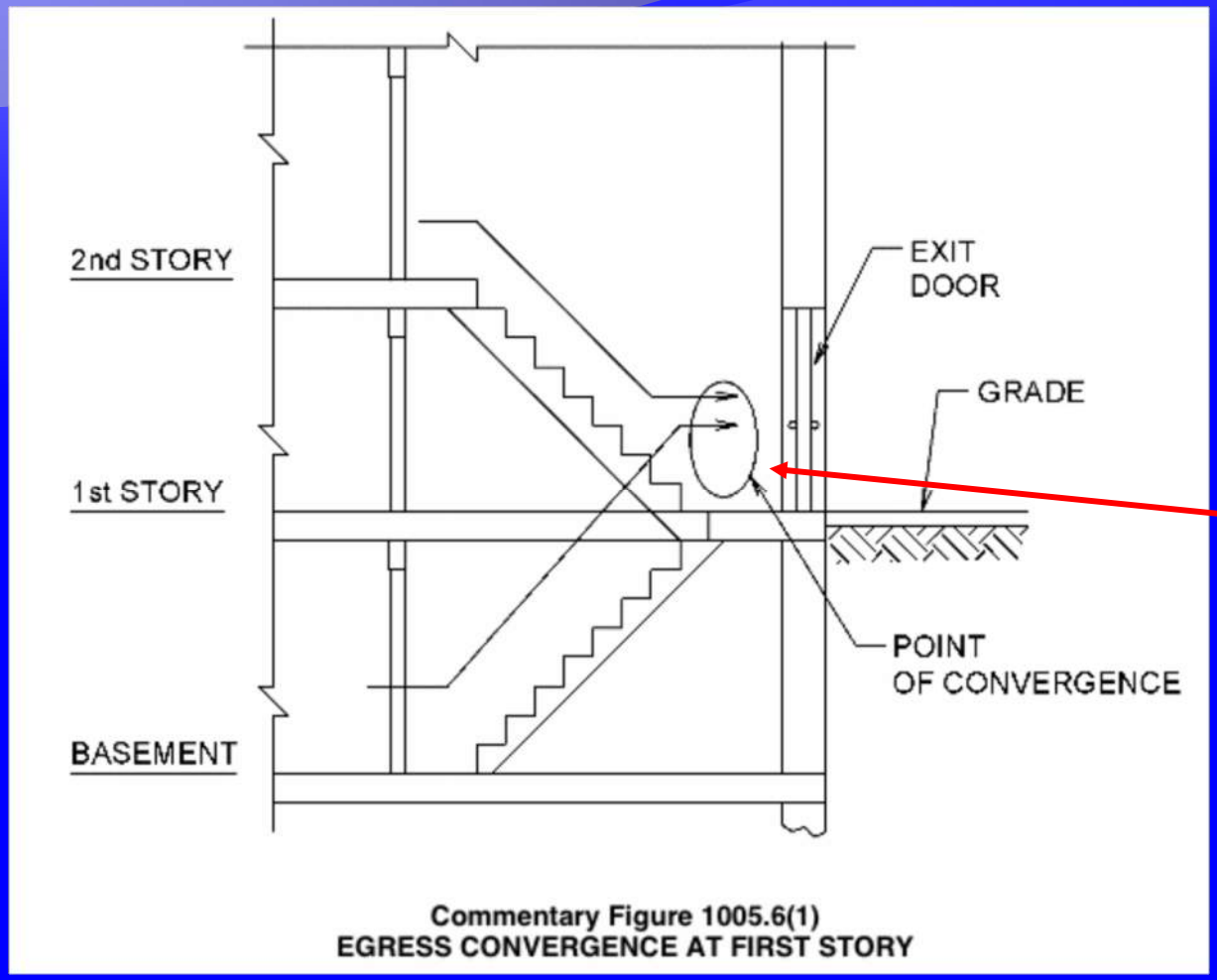
1004.2.1 Intervening spaces
……Design of egress path capacity shall be based on the cumulative portion of occupant loads of all rooms, areas or spaces to that point along the path of egress travel.

This does not apply to floor levels!

TABLE 1004.5
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	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Exhibit gallery and museum	30 net
Assembly with fixed seats	See Section 1004.6
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	150 gross
Concentrated business use areas	See Section 1004.8
Courtrooms—other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
Group H-5 fabrication and manufacturing areas	200 gross
Industrial areas	100 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2
Mercantile	60 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks, swimming pools	
Rink and pool	50 gross
Decks	15 gross
Stages and platforms	15 net
Warehouses	500 gross

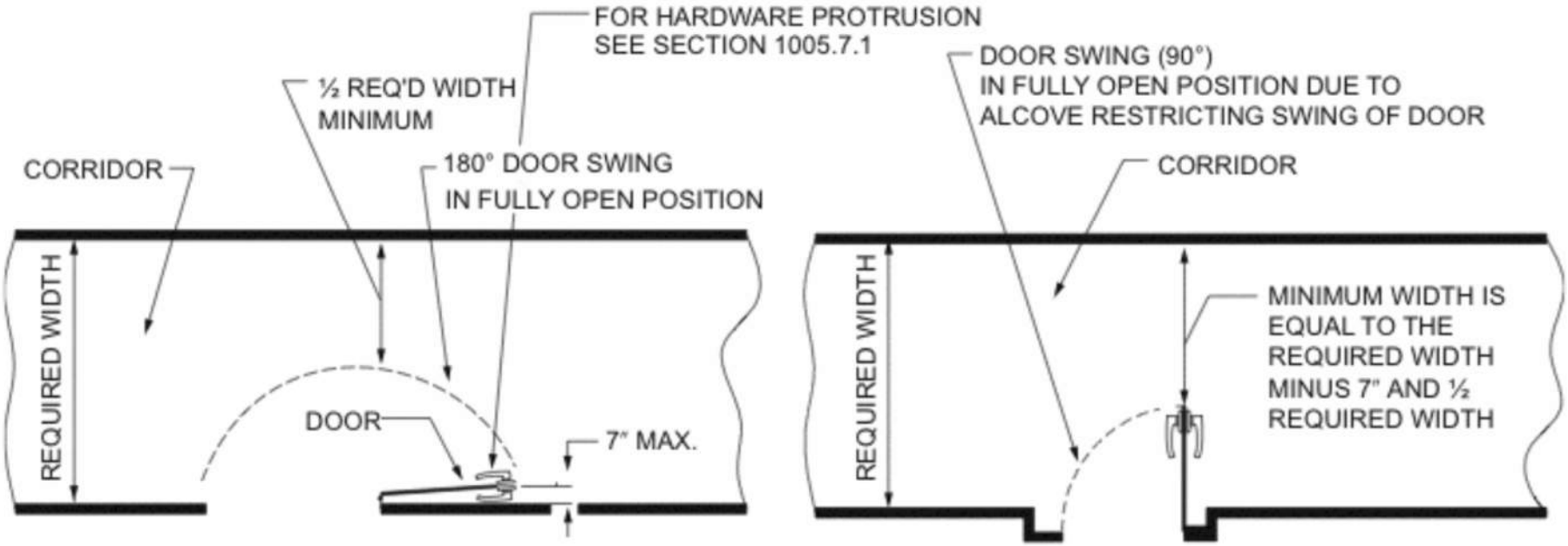
1005.6 Egress Convergence



Commentary Figure 1005.6(1)
EGRESS CONVERGENCE AT FIRST STORY

Note:
an "approved" barrier" is required to prevent people from continuing beyond the exit level

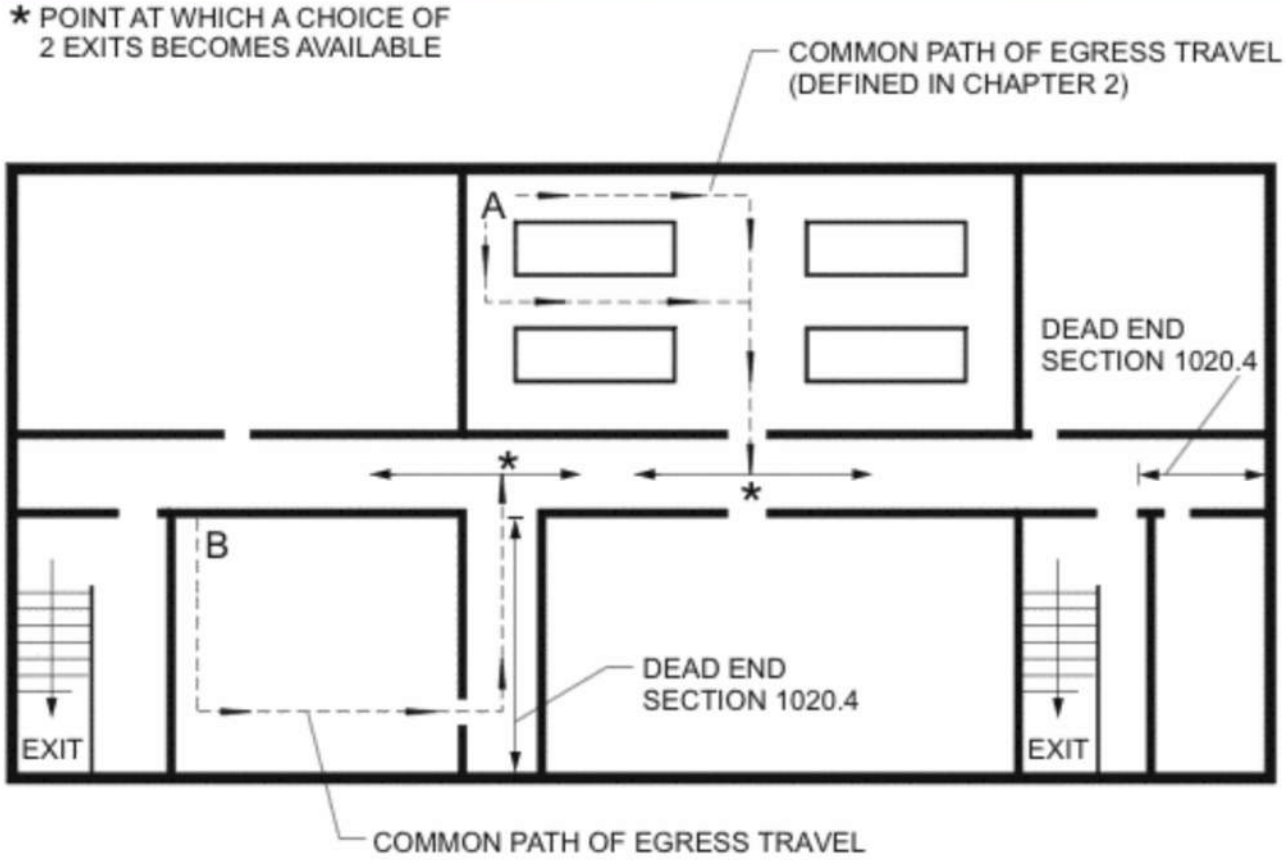
1005.7.1 - Doors



For SI: 1 inch = 25.4 mm, 1 degree = 0.01745 rad.

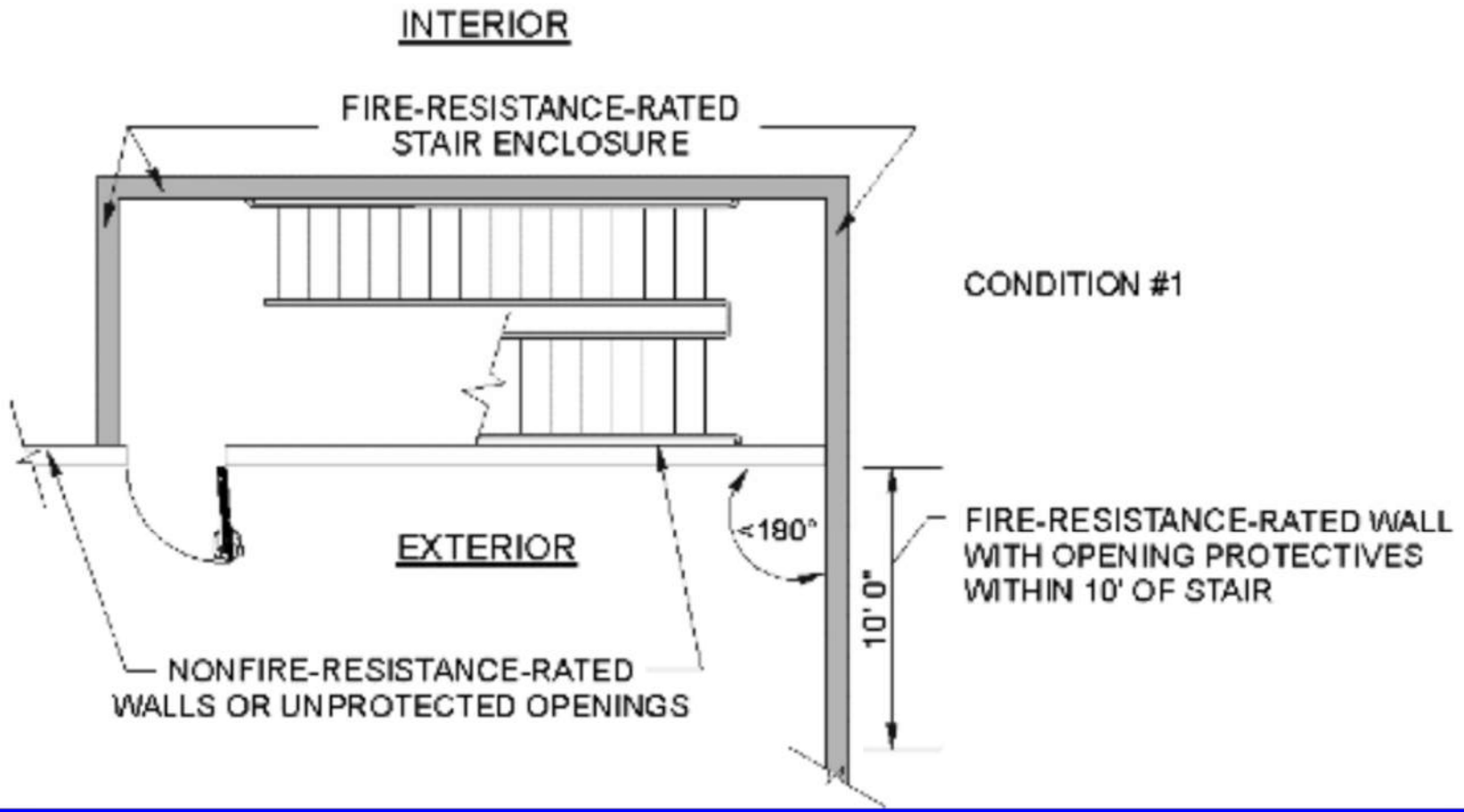
Commentary Figure 1005.7.1
TYPICAL DOOR RESTRICTIONS INTO PASSAGEWAY, AISLE AND CORRIDOR WIDTH

Common Path of Egress

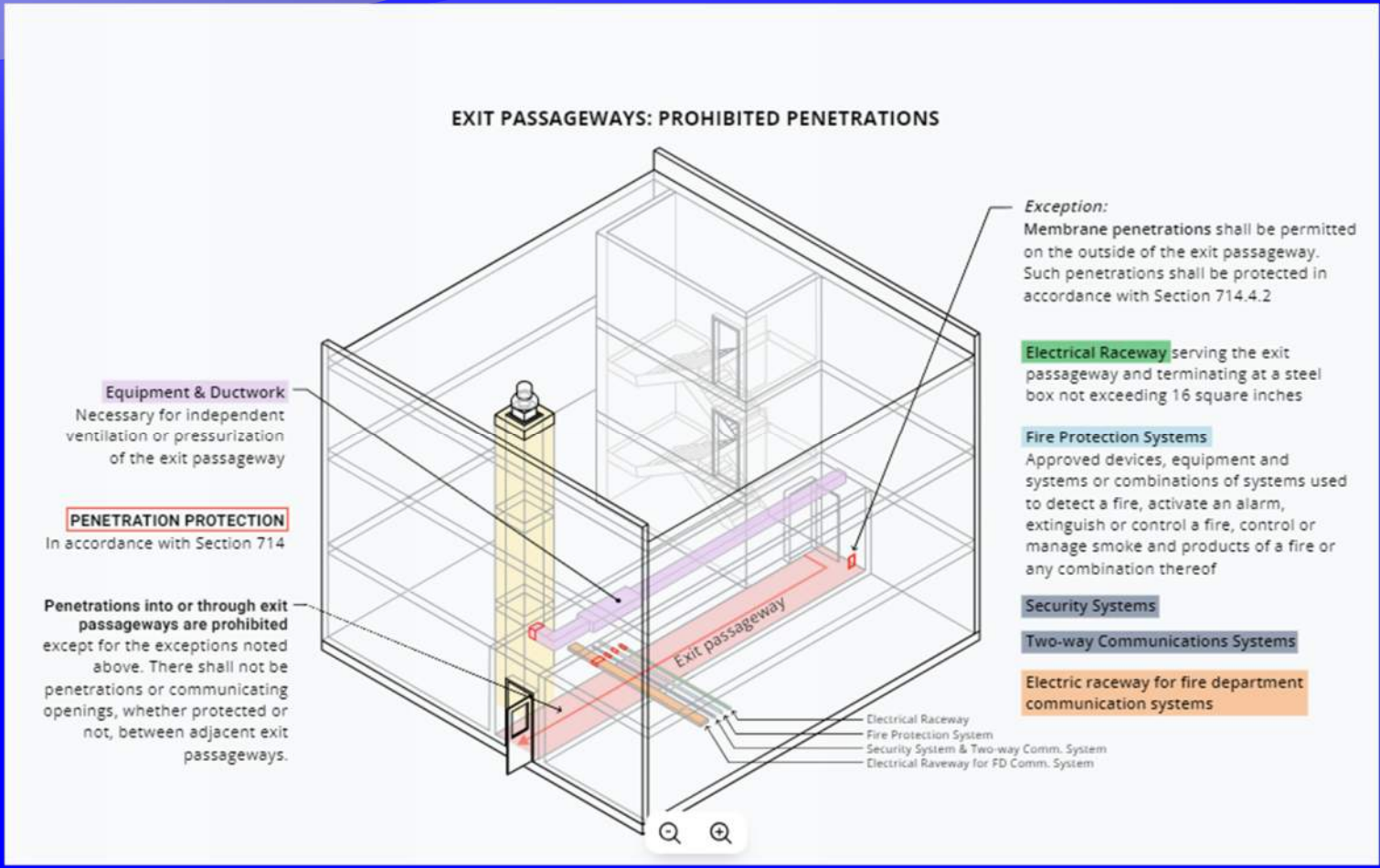


Commentary Figure 1006.2.1
COMMON PATH OF EGRESS TRAVEL

Exit Stairs and rated walls



1024 Exit Passages



1024 Exit Passages

1024.1 Exit passageways.

An exit passageway shall not be used for any purpose other than as a means of egress and a circulation path.

1024.5 Openings

…..Except as permitted in Section 402.8.7, openings in exit passageways other than unprotected exterior openings shall be limited to those necessary for exit access to the exit passageway from normally occupied spaces and for egress from the exit passageway……

CHAPTER 11
ACCESSIBILITY

"ALL INCLUSIVE"

2022 HB 4076

Sec. 102a. (1) The commission shall adopt….. a standardized design that is a variation of the current international symbol of access…. (a) Depict a dynamic character leaning forward, (b) Provide contrasting background, (c) Be substantially equivalent to the international symbol of access, (d) Be simple and avoid any secondary meaning.

GUIDANCE ?

2023 HB 4649

Renovations requiring a permit….for $10,000 or more shall install and provide access to not less than 1 height adjustable, adult-sized changing table, with a privacy wall, in toilet facility or other space within the building or structure that is universal as to gender and is available to the public: (a) State owned with capacity of 1,500 persons, (b) Exhibition or entertainment, movie theatre, shopping mall or store larger than 40,000 SF, (c) Public display, museum, library, gallery, (d) Recreation, park, zoo, amusement park, (e) Any, airport, bus station, rest stop, education with 10 full-time employees, hospitals, recreation facility with 10 full-time employees.

GUIDANCE ? 2024 IBC

1110.2.1.2 Family or assisted-use toilet room. Family or assisted-use toilet rooms shall include only one water closet and only one lavatory. A family or assisted-use bathing room in accordance with section 1110.2.3 shall be considered to be family or assisted-use toilet room. Exception: The following additional plumbing fixtures shall be permitted in a family or assisted-use toilet room: 1. A urinal, 2. A child-height water closet, 3. A child height lavatory, 4. An adult changing station also used for bathing.

GUIDANCE ? 2024 IBC

1110.4 Adult changing stations.

Where provided, adult changing stations shall be accessible. Where required, adult changing stations shall be accessible and shall comply with sections 1110.4.1 through 1110.4.4.

GUIDANCE ? ICC A117.1-2017

WITH SUPPLEMENT 1:
STANDARD FOR ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES

SECTION 613 ADULT CHANGING STATIONS
613.1 General.
Adult changing stations shall comply with Sections 613.2 through 613.4

GUIDANCE ? ICC A117.1-2017

613.2 Single-user or family or assisted-use toilet or bathing room.

Where adult changing stations are provided in a toilet room with only one water closet and one lavatory, or in a family or assisted-use toilet or bathing room, the room shall provide all of the following components:

1. A dispenser for soap complying with 308,
2. A hand towel dispenser or hand dryer complying with Table 603.6,
3. A coat hook located in close proximity to the changing surface.

GUIDANCE ? ICC A117.1-2017

4. A waste receptacle,
5. Signage indicating "Adult Changing Station" provided at the entrance to the room and complying with the visual character requirements in Section 703.2
6. Signage indicating the weight capacity and instructions for operation of the changing station within the room.

GUIDANCE ? ICC A117.1-2017

Similar requirements for:

613.2.2 Multiuser toilet or bathing rooms., and

613.2.3 Room or space other than a toilet room or bathing room.

613.4 Changing Surface.

A changing surface shall be provided and shall comply with Section 613.4

GUIDANCE ? ICC A117.1-2017

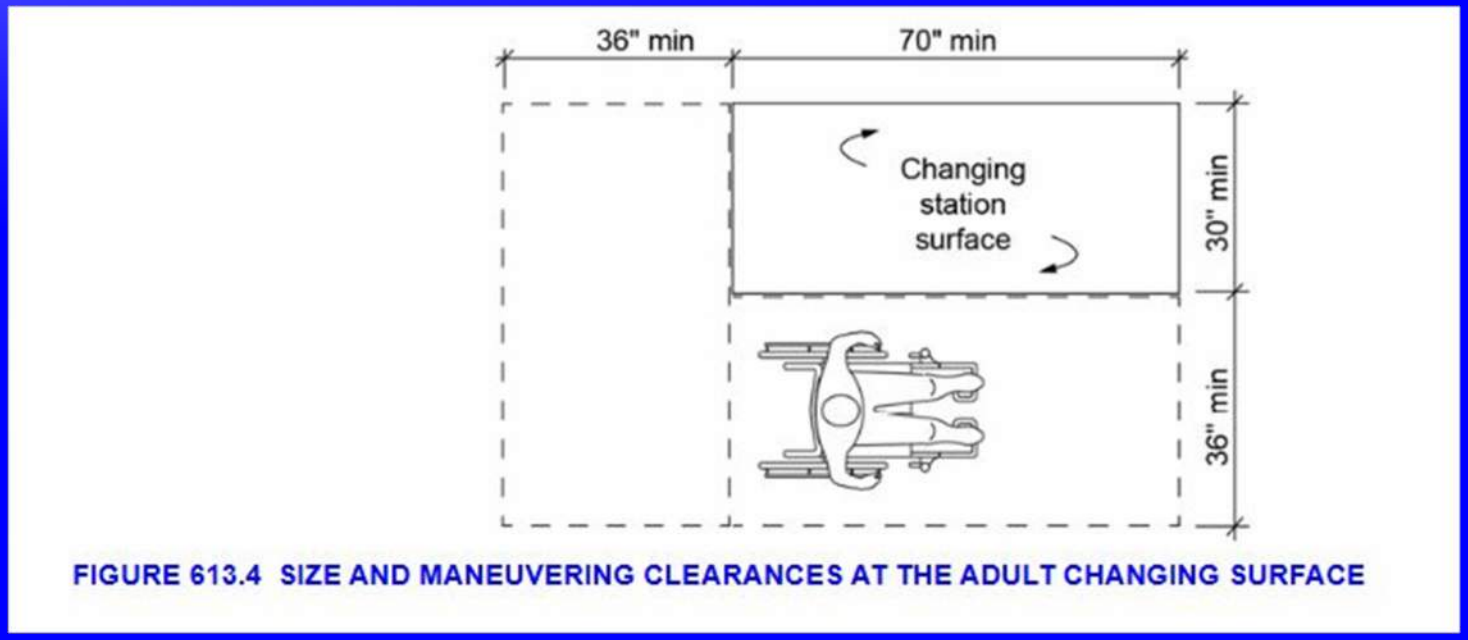


FIGURE 613.4 SIZE AND MANEUVERING CLEARANCES AT THE ADULT CHANGING SURFACE

GUIDANCE ? ICC A117.1-2017

613.4.1 Size.

The changing surface shall be 70 inches minimum in length and 30 inches minimum in width.

613.4.2 Capacity.

Materials, fastening mounting devices and support structure shall support a user weight of not less than 400 pounds

GUIDANCE ? ICC A117.1-2017

613.4.3 Height adjustability.

The changing surface shall be adjustable at variable heights from 17 inches minimum to 38 inches maximum above the floor as measured to the top of the changing surface. Exception: Where the adult changing station is not required by the administrative authority, a fixed height changing surface shall be permitted and shall be mounted with the top of the changing surface 19 inches minimum and 23 inches maximum above the floor.

GUIDANCE ? ICC A117.1-2017

613.4.4 Maneuvering clearances.

Maneuvering clearances at the adult changing surface complying with Sections 613.4.4.1 and 613.4.4.2 shall be provided. Such maneuvering clearances shall be measured where the adult changing surface is in the operational position.

GUIDANCE ? ICC A117.1-2017

613.4.4.1 Side maneuvering clearance.

A side maneuvering clearance 36 inches minimum in depth shall be provided at the adult changing surface along the open long side of the changing surface. Exception: In the raised position, the side rail shall be permitted to overlap the side clearance.

GUIDANCE ? ICC A117.1-2017

613.4.4.2 End maneuvering clearance.
An end maneuvering clearance 36 inches minimum width shall be provided along the depth of the one end of the changing surface. The depth of the end maneuvering clearance shall extend the depth of the changing surface and the side maneuvering clearance.

Exceptions: 1. An end maneuvering clearance 24 inches minimum in width shall be permitted where a clear floor space complying with Section 305.3 is provided within the room beyond the maneuvering clearances for the changing surface.

GUIDANCE ? ICC A117.1-2017

Exception: 2. Where installed in locations specified in Section 613.2.3, end maneuvering clearances complying with Section 613.4.4.2 are not required.

GUIDANCE ? ICC A117.1-2017

613.4.5 Side rail.

Where side rails are provided at the changing surface they shall comply with Sections 613.4.5.1 and 613.4.5.2.

613.4.5.1 Size and location.

Side rails shall be a minimum ⅔ of the length of the changing surface and shall be centered +/- 3 inches along the long open sides of the changing surface.

GUIDANCE ? ICC A117.1-2017

613.4.5.2 Rail positioning.

Side rails shall be capable of being raised and lowered. The side rail shall be fixed in place when in the raised position. The top of the side rail shall extend 5 inches minimum above the top of the changing surface.

CHAPTER 12
INTERIOR ENVIRONMENT

"THE OCCUPIED ENVIRONMENT"

SECTION 1206 SOUND TRANSMISSION

1206.2 Airborne Sound.

Walls, Partitions and floor-ceiling assemblies separating *dwelling units* and *sleeping units* from each other or from public or service areas shall have a sound transmission class of not less than 50….or 45 if field tested….Penetrations…. treated to maintain the required ratings….

SECTION 1208 INTERIOR SPACE DIMENSIONS

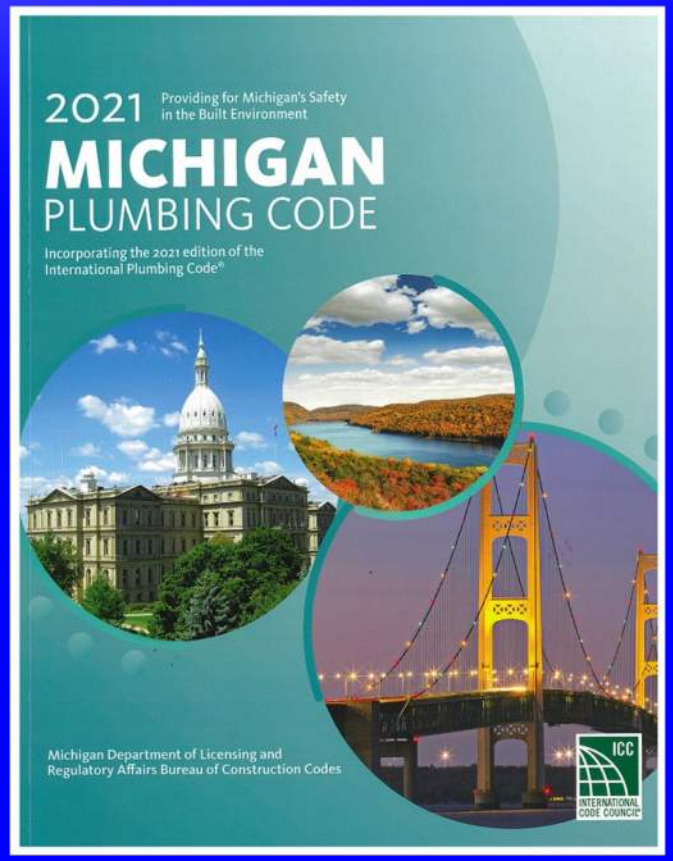
1208.1 Minimum room widths.

Habitable space, other than kitchens, shall be not less than 7 feet in any plan dimension….

Section 202 Definitions.

HABITABLE SPACE. a space in a building for living, sleeping, eating or cooking. Bathrooms, toilet rooms, closets halls, storage, or utility spaces and similar areas are not considered *habitable spaces.*

2021
Michigan Plumbing Code



CHAPTER 4 FIXTURES…

"Provide Less Plumbing Fixtures?"

SECTION 403 MINIMUM PLUMBING FACILITIES

403.1 Minimum number of fixtures.

Plumbing fixtures shall be provided for the type of occupancy and in the minimum number shown in Table 403.1.....

TABLE 403.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES

TABLE 403.1
MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a]
(See Sections 403.1.1 and 403.2)

NO.	CLASSIFICATION	OCCUPANCY	DESCRIPTION	WATER CLOSETS (URINALS SEE SECTION 419.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN[e,f] (SEE SECTION 410.1)	OTHER
				MALE	FEMALE	MALE	FEMALE			
1	Assembly	A-1[d]	Theaters and other buildings for the performing arts and motion pictures	1 per 125	1 per 65	1 per 200			1 per 500	1 service sink
		A-2[d]	Nightclubs, bars, taverns, dance halls, and buildings for similar purposes	1 per 40	1 per 40	1 per 75			1 per 500	1 service sink
			Restaurants, banquet halls and food courts	1 per 75	1 per 75	1 per 200			1 per 500	1 service sink
			Casino gaming areas	1 per 100 for the first 400 and 1 per 250 for the remainder exceeding 400	1 per 50 for the first 400 and 1 per 150 for the remainder exceeding 400	1 per 250 for the first 750 and 1 per 500 for the remainder exceeding 750		____	1 per 1,000	1 service sink
		A-3[d]	Auditoriums without	1 per 125	1 per 65	1 per 200			1 per 500	1 service sink

SECTION 403 MINIMUM PLUMBING FACILITIES

403.1.1 Fixture calculations.

To determine the occupant load of each sex, the occupant load shall be divided in half….Exceptions: ….2. Where multiple-user facilities are designed to serve all genders, the minimum fixtures count shall be calculated 100% based on total occupant load….3. Distribution of the sexes is not required where single-user water closets and bathing room fixtures are provided in accordance with section 403.1.2.

SECTION 403 MINIMUM PLUMBING FACILITIES

403.1.2 Single-user toilet and bathing room fixtures.

The plumbing fixtures located in single-user toilet and bathing rooms, including family or assisted-use toilet and bathing rooms that are required by Section 1109.2.1 of the Michigan Building Code, shall contribute toward the total number of required plumbing fixtures for a building or a tenant space….and be identified as being available for use by all persons regardless of their sex.

SECTION 403 MINIMUM PLUMBING FACILITIES

403.1.2 Single-user toilet and bathing room fixtures. (cont.)

The total number of fixtures shall be permitted to be based on the required number of separate facilities or based on the aggregate of any combination of single-use or separate facilities.

SECTION 403 MINIMUM PLUMBING FACILITIES

403.2 Separate facilities.

Where plumbing fixtures are required, separate facilities shall be provided for each sex.

Exceptions:.....5. Separate facilities shall not be required to be designated by sex where single-user toilet rooms are provided in accordance with Section 403.1.2

SECTION 403 MINIMUM PLUMBING FACILITIES

403.2 Separate facilities. (continued)

Exceptions: 6. Separate facilities shall not be required where rooms having both water closets and lavatory fixtures are designed for use by both sexes and privacy for water closets is provided in accordance with Section 405.3.4. Urinals shall be located in an area visually separated from the remainder of the facility or each urinal that is provided shall be located in a stall.

SECTION 403 MINIMUM PLUMBING FACILITIES

403.3.1 Access.

The route to the public toilet facilities required by section 403.3, shall not pass through kitchens, storage rooms, or closets. Access to the required facilities shall be from within the building. All routes shall comply with the accessibility requirements of the Michigan Building Code. The public shall have access to the required toilet facilities at all times that the building is occupied.

SECTION 403 MINIMUM PLUMBING FACILITIES

403.3.6 Door locking.

Where a toilet room is provided for the use of multiple occupants, the egress door for the room shall not be lockable from the inside of the room. This section does not apply to family or assisted-use toilet rooms.

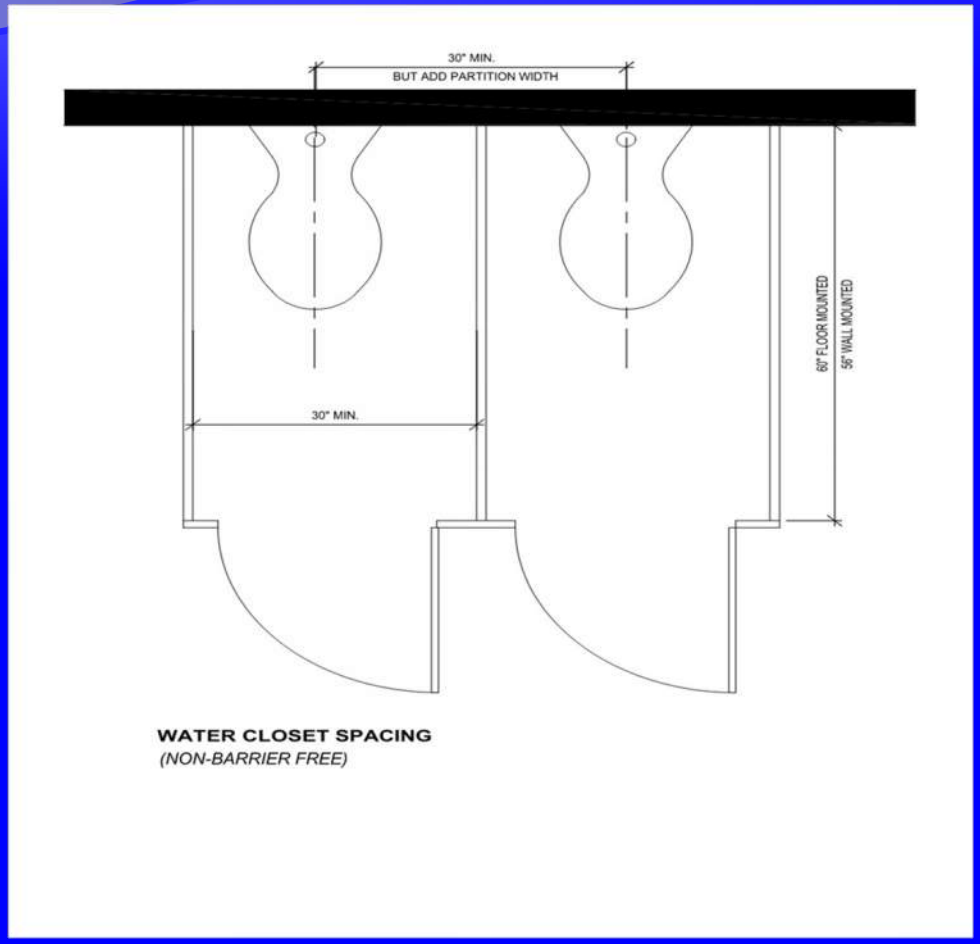
Water Closet Clearances and Partitions

405 Installation of Fixtures
405.3 Setting, 405.3.1 Water Closets, Urinals, Lavatories, and Bidets

- 15"minimum from wall.
- 30" minimum between fixtures
- HOWEVER! Water closet stalls must be 30"minimum clear. So, actual fixture spacing must take into account the thickness of the partition.
- 21"minimum space in front of a fixture
- Stalls must be a minimum of 60" deep for floor mounted water closets and 56" for wall-hung water closets.

405.3.4 Stalls with doors are required for all water closets in toilet rooms with multiple fixtures.

Water Closet Clearances and Partitions



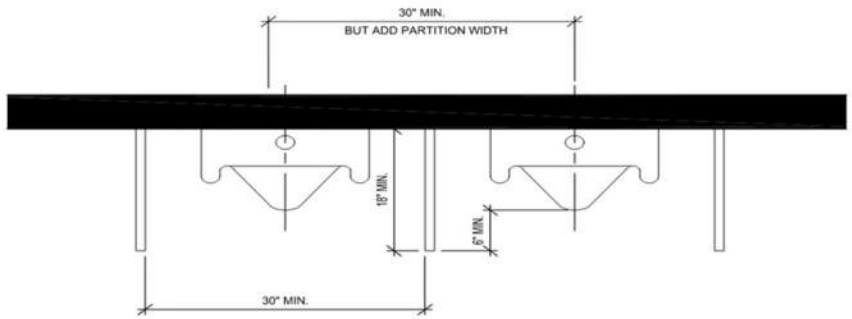
WATER CLOSET SPACING
(NON-BARRIER FREE)

Urinal Clearances and Partitions

405 Installation of Fixtures
405.3 Setting, 405.3.5 Urinal Partition

- 15”minimum from wall.
- 30” minimum between fixtures
- HOWEVER! Water closet stalls must be 30”minimum clear. So, actual fixture spacing must take into account the thickness of the partition.
- Bottom of the partition must be 12”maximum above the floor and the top 60” minimum AFF.
- Partition must be 18” deep, minimum but at least 6” beyond the outermost front lip.

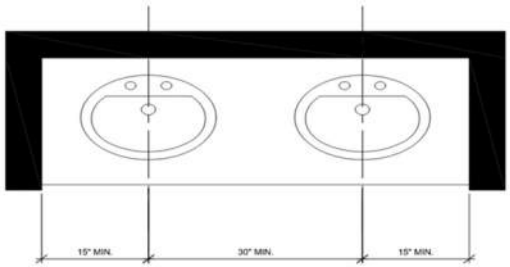
Urinal Clearances and Partitions



URINAL SPACING
(NON-BARRIER FREE)

Lavatory Clearances

405 Installation of Fixtures
405.3 Setting, 405.3.1 Water Closets, Urinals, Lavatories, and Bidets



SINKS AND LAVATORY SPACING

Other Plumbing Code Notes

413.5 - Floor drains are required in toilet rooms containing three (3) or more water closets or water closets and urinals.

Bottle fillers added to a drinking fountain do NOT count as a second drinking fountain.

2021
Michigan Mechanical Code

Refrigerant Pipe Installation

- Section 1109 Refrigerant Pipe Installation is NEW in the 2021 MMC!
- 1109.2.2 Refrigerant Pipe Enclosures: Piping shall be enclosed unless it is above 7'-3" AFF, within 6' of the unit or appliance, or located in a machinery room.
- Piping is prohibited in stairwells, exit passageways, fire rated exit access corridor, elevator / dumbwaiter shaft.
- 1109.2.5 Refrigerant Pipe Shafts: Piping penetrating two or more floors shall been closed in a fire rated shaft enclosure complying with section 713. Exception: Using R-718 refrigerant (water).
- 1109.3.2 Shaft Ventilation: The shaft must be mechanically or naturally vented. Naturally ventilated shafts must be vented outside with a 4" min. pipe at the base and a vent pipe at the top. Consider that the shaft is exposed to the exterior environment.

Boiler Room Requirements

- Boiler room requirements are dictated by the building code. There is nothing in the mechanical or plumbing code that dictates boiler room requirements.
  - Per Michigan Building Code:
    - **Table 509 Incidental Uses**
      - Rooms with Boilers where the largest piece of equipment is over 15 psi and 10 horsepower - 1 hour separation and/or automatic sprinkler system.
      - If automatic sprinkler system is selected, then per 509.4.2 Protection, the space must be enclosed by a smoke tight enclosure. This is NOT a smoke barrier or smoke partition by definition.

Boiler Room Requirements

- Per Michigan Building Code:
  - **1006.2.2.1 – Boiler, incinerator and furnace rooms**
    - Two *exit access doorways* are required in boiler, incinerator and furnace rooms where the area is over 500 square feet (46 m^2) and any fuel-fired equipment exceeds 400,000 British thermal units (Btu)(422 000 KJ) input capacity. Where two *exit access doorways* are required, one is permitted to be a fixed ladder or an *alternating tread device. Exit access doorways* shall be separated by a horizontal distance equal to one-half the length of the maximum overall dimension of the room.
  - **1006.2.2.2 – Refrigerant machine rooms**
    - Refrigerant machine rooms have similar egress requirements.

Fire Pump Rooms

- Governed by NFPA 20
- 2-Hour Fire Barrier Enclosure Required
- Direct exit to exterior required or exit through a corridor with the same rating
- Location of the room must be approved by the Fire Marshal
- Emergency Power
- Protection against interruption of service
  - Protect from damage caused by explosion, fire, flood, earthquake, rodents, insects, windstorm, freezing, vandalism, etc.

Section 903.3
Freeze Protection per NFPA 13
(13R & 13D similar)

- *Must maintain **"…reliably…"***

[F] 903.3 Installation requirements. *Automatic sprinkler systems* shall be designed and installed in accordance with Sections 903.3.1 through 903.3.8.

[F] 903.3.1 Standards. Sprinkler systems shall be designed and installed in accordance with Section 903.3.1.1 unless otherwise permitted by Sections 903.3.1.2 and 903.3.1.3 and other chapters of this code, as applicable.

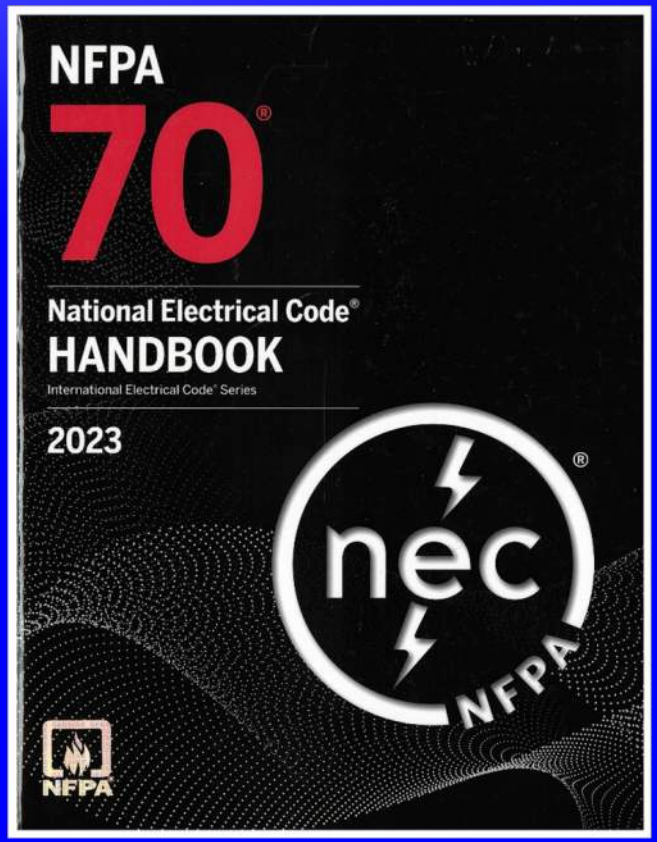
16.4.1.1 Where any portion of a system is subject to freezing and the temperatures cannot be reliably maintained at or above 40° F (4° C), the system shall be installed as a dry pipe or preaction system.*

Fire Pump Room Requirements Per NFPA 20

- Table 4.13.1.1.2

Table 4.13.1.1.2 Equipment Protection		
Pump Room/House	**Building(s) Exposing Pump Room/House**	**Required Separation**
Not Sprinklered	Not Sprinklered	2-Hour fire-rated or 50 ft (15.3 m)
Not Sprinklered	Fully Sprinklered	2-Hour fire-rated or 50 ft (15.3 m)
Fully Sprinklered	Not Sprinklered	2-Hour fire-rated or 50 ft (15.3 m)
Fully Sprinklered	Fully Sprinklered	1-Hour fire-rated or 50 ft (15.3 m)

2023
NFPA 70 National Electrical Code Handbook



When do electrical rooms / closets need to be fire rated (1 or 2 hour)?

- NEC 450.21(B)
  - We often meet Exception No. 2 based on our specifications.

(B) Over 112½ kVA. Individual dry-type transformers of more than 112½ kVA rating shall be installed in a transformer room of fire-resistant construction having a minimum fire rating of 1 hour.

Exception No. 1: Transformers with Class 155 or higher insulation systems and separated from combustible material by a fire-resistant, heat-insulating barrier or by not less than 1.83 m (6 ft) horizontally and 3.7 m (12 ft) vertically shall not be required to be installed in a transformer room.

Exception No. 2: Transformers with Class 155 or higher insulation systems and completely enclosed except for ventilating openings shall not be required to be installed in a transformer room.

When do electrical rooms / closets need to be fire rated (1 or 2 hour)?

- NEC 450.26 (Part III has the requirements for a Transformer Vault)
  - Keep in mind that most medium voltage transformers these days are "less-flammable liquid-insulated" which do not require a transformer vault.

450.26 Oil-Insulated Transformers Installed Indoors. Oil-insulated transformers installed indoors shall be installed in a vault constructed as specified in Part III of this article.

Exception No. 1: Where the total capacity does not exceed 112½ kVA, the vault specified in Part III of this article shall be permitted to be constructed of reinforced concrete that is not less than 100 mm (4 in.) thick.

Exception No. 2: Where the nominal voltage does not exceed 1000, a vault shall not be required if suitable arrangements are made to prevent a transformer oil fire from igniting other materials and the total

When do electrical rooms / closets need to be fire rated (1 or 2 hour)?

- NEC 700.10 (D)(1) and (3)
  - More often than not we will have fire protection in the room so we would NOT need a fire rated room, but this is good to know either way.

(D) Fire Protection.

(1) Occupancies. Emergency systems shall meet the additional requirements in 700.10(D)(2) through (D)(4) in the following occupancies:

(1) Assembly occupancies for not less than 1000 persons
(2) Buildings above 23 m (75 ft) in height
(3) Educational occupancies with more than 300 occupants

(3) Feeder-Circuit Equipment. Equipment for feeder circuits (including transfer switches, transformers, and panelboards) shall be located either in spaces fully protected by an approved automatic fire protection system or in spaces with a 2-hour fire resistance rating.

When do electrical rooms / closets need to be fire rated (1 or 2 hour)?

- Additionally, if you have an indoor generator, that room will need to be 2-hour fire rated per NFPA 110 7.2.1.1

7.2 Location.

7.2.1 Indoor EPS Installations. The EPS shall be installed in a separate room for Level 1 installations.

7.2.1.1 The EPS room shall be separated from the rest of the building by construction with a 2-hour fire resistance rating.

7.2.1.2 EPSS equipment shall be permitted to be installed in the EPS room.

7.2.1.3 No other equipment, including architectural appurtenances, except those that serve this space, shall be permitted in the EPS room.

When do electrical rooms require two exits? When, if ever, does one of those have to be directly outside?

- No code requirements to egress directly outside (other than for a Fire Pump Room), but for buildings with larger electrical rooms/equipment, it is ideal to have a set of double doors leading directly outside to aid in future equipment replacement.

When do electrical rooms require two exits?

- NEC 110.26 (C)(2)

(2) Large Equipment. For large equipment that contains overcurrent devices, switching devices, or control devices, there shall be one entrance to and egress from the required working space not less than 610 mm (24 in.) wide and 2.0 m (6½ ft) high at each end of the working space. This requirement shall apply to either of the following conditions:

(1) For equipment rated 1200 amperes or more and over 1.8 m (6 ft) wide

(2) For service disconnecting means installed in accordance with 230.71(B) where the combined ampere rating is 1200 amperes or more and where the combined width is over 1.8 m (6 ft)

A single entrance to and egress from the required working space shall be permitted where either of the conditions in 110.26(C)(2)(a) or (C)(2)(b) is met.

(a) *Unobstructed Egress.* Where the location permits a continuous and unobstructed way of egress travel, a single entrance to the working space shall be permitted.

(b) *Extra Working Space.* Where the depth of the working space is twice that required by 110.26(A)(1), a single entrance shall be permitted. It shall be located such that the distance from the equipment to the nearest edge of the entrance is not less than the minimum clear distance specified in Table 110.26(A)(1) for equipment operating at that voltage and in that condition.

When do electrical room doors need to swing out? When do they need panic hardware / exit devices?

- NEC 110.26 (C)(3)

> **(3) Personnel Doors.** Where equipment rated 800 amperes or more that contains overcurrent devices, switching devices, or control devices is installed and there is a personnel door(s) intended for entrance to and egress from the working space less than 7.6 m (25 ft) from the nearest edge of the working space, the door(s) shall open at least 90 degrees in the direction of egress and be equipped with listed panic hardware or listed fire exit hardware.

Electrical Room Size

- Electrical rooms are going to be larger now that NEC 2023 is adopted.
  - NEC 110.26 now states that:

    "Open equipment doors shall not impede access to and egress from the working space. Access or egress is impeded if one or more simultaneously opened equipment doors restrict working space access to be less than 24 in wide and 6.5 ft high."

    - Essentially, not only do we need our 3'-4' working clearance, but we also need to make sure our 24" egress path is maintained with all equipment doors opened.

  - NEC 700.5(D) was added so that we now require "redundant transfer equipment" for emergency systems.
    - This essentially means we need to Bypass Isolations Transfer Switches, which are considerably larger. There are some exceptions to this that can be utilized, but a conversation with an owner must be had before these exceptions can be taken.

Buildings with Generators

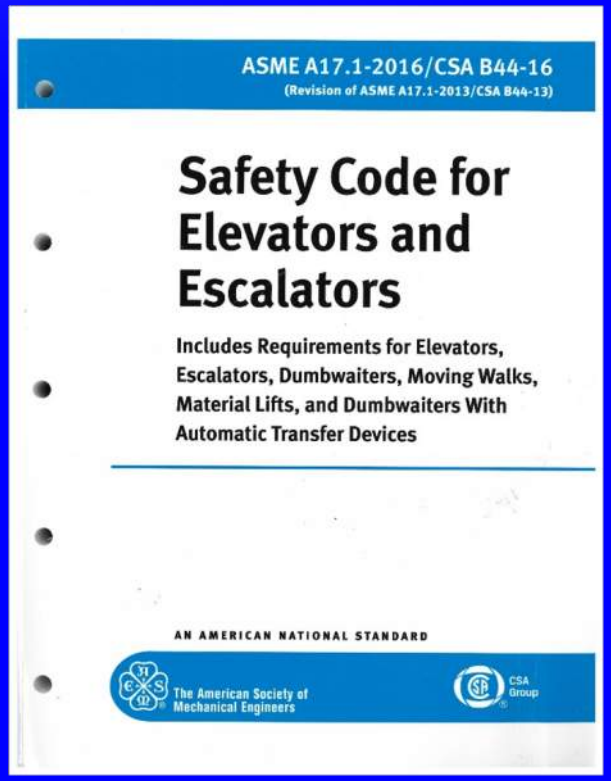
- For buildings with a generator feeding emergency lighting, we sometimes need a separate room for the automatic transfer switches. In most cases, this does not need to be a dedicated emergency electrical room, but it often makes sense to do so. Just a conversation to have with your electrical engineer. (NFPA 110 7.2.3)

Thank You

Thanks to Peter Basso Associates for assisting in the preparation of the MEP-FP information

Michigan Elevator Code

2016 Michigan Elevator Rules, Incorporating ASME, A17.1-2016 Safety Code for Elevators and Escalators with Michigan amendments, additions or deletions
Adopted March 29, 2023



Two-Way Communication

- A two-way communication system is required at the landing of each elevator or bank of elevators (MBC 1009.8)

1009.8 Two-Way Communication Diagram

A two-way communication system complying with Sections 1009.8.1 and 1009.8.2 shall be provided at the landing serving each elevator or bank of elevators on each accessible floor that is one or more stories above or below the *level of exit discharge*.

Exceptions:

1. Two-way communication systems are not required at the landing serving each elevator or bank of elevators where the two-way communication system is provided within *areas of refuge* in accordance with Section 1009.6.5.
2. Two-way communication systems are not required on floors provided with *ramps* conforming to the provisions of Section 1012.
3. Two-way communication systems are not required at the landings serving only service elevators that are not designated as part of the *accessible means of egress* or serve as part of the required *accessible route* into a facility.
4. Two-way communication systems are not required at the landings serving only freight elevators.
5. Two-way communication systems are not required at the landing serving a private residence elevator.

Machine-room-less Elevator Disconnects

- Machine Roomless elevator disconnects need to be installed in a lockable enclosure or dedicated room within 25 feet of the elevator landing (Michigan Elevator Rules R 408.7041).
- Enclosure must have the same rating as the elevator shaft.

Elevators installed without a machine room or control room must locate the required disconnecting means outside of the hoistway in a separate dedicated control space, readily accessible and adjacent to the control space that contains the control.

The disconnecting means must be in a single dedicated space or dedicated room, intended with or without full body entry, at a distance not to exceed 25 feet from the landing that contains the elevator control, inspection, or test panel. The disconnecting means must be secured so that only elevator journeyman and qualified personnel may gain access. If the controller is within an entrance assembly, signage must be placed in plain view, at or near the controller, and state the location of the disconnecting means.

Access to machine rooms, control rooms, machine spaces, or control spaces may not be through restrooms, lavatories, locker rooms, or associated vestibules. Where enclosed ceilings are required or provided, they must be of a solid type with no access panels. Drop type ceilings are not permitted. Machine rooms, control rooms, machinery spaces, and control spaces may not be used as a pass through or for access to other areas. Building access panels or doors are prohibited in these areas.

2021 MBC SECTION 3005

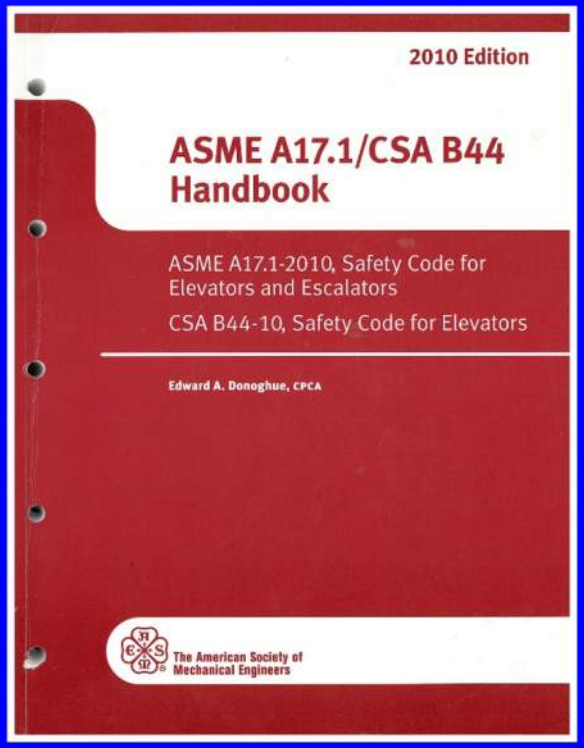
Machine Roomless elevators still have machines, however they are in the hoistways of the elevator:

3005.2 Venting.
Elevator machine rooms, machinery spaces that contain the driving machine, and control rooms or spaces that contain the operation or motion controller for elevator operation shall be provided with an independent *ventilation* or air-conditioning system to protect against the overheating of the electrical equipment. The system shall be capable of maintaining temperatures within the range established for the elevator equipment.

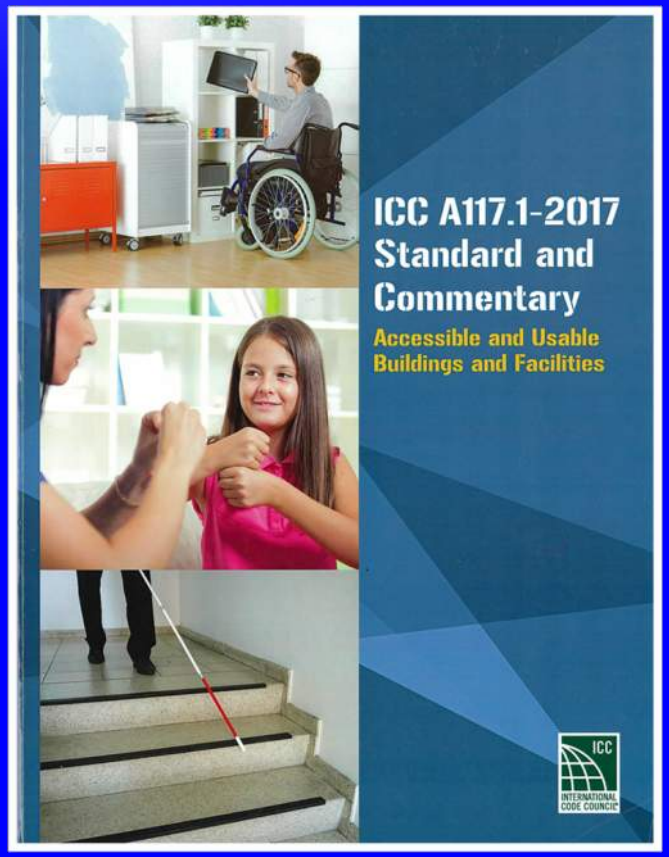
Detroit Elevator Code

2010 City of Detroit Elevator Code, Incorporating ASME A17.1 – 2010 / CSA B44-10 Safety Code for Elevators and Escalators with City of Detroit amendments, additions or deletions. Adopted December 13, 2019

WARNING - New rules for MRL elevator disconnect closets!



2017
ICC A117.1-2017
Accessible and Usable Buildings and facilities



- New Barrier Free Requirements Referenced in the 2021 Building Code!
- ICC A117.1-2017 has **stricter** requirements than the current ADA Guidelines.

Need Help?

- JUST ASK!
- Ask Senior Staff
- Check the Code Commentary
- "Building Codes Illustrated"
- Code Consultants
- Talk to the AHJ!

- JOIN the ICC
- www.ICCsafe.org
- Code interpretations
- Code book discounts
- Newsletters
- Other benefits

Questions??
NO? Why Not?

Thank you!!