Wisconsin
Department of Commerce

Wisconsin Commercial Building Code

Structural -- Chapters 19 through 25

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IBC STRUCTURAL CHAPTERS

16 – STRUCTURAL DESIGN REQUIREMENTS

17 – STRUCTURAL TESTS AND SPECIAL INSPECTIONS

18 – SOILS AND FOUNDATIONS

19 – CONCRETE

20 – ALUMINUM

21 – MASONRY

22 – STEEL

23 – WOOD

24 – GLASS AND GLAZING

25 – GYPSUM BOARD LATH AND PLASTER

IBC Chapter 19

CONCRETE

- General (Section 1901)
  - Plain and reinforced concrete design based on ACI 318-05
  - Construction documents

CONCRETE (Cont'd)

- Definitions (Section 1902/ACI 318)
  - Column
  - Concrete
  - Plain concrete
  - Plain reinforcement
  - Precast concrete
  - Prestressed concrete
  - Reinforced concrete
  - Structural concrete

IBC Chapter 19

CONCRETE (Cont'd)

- Specifications for Tests and materials (Section 1903)
  - ACI 318
  - Glass Fiber Reinforced concrete to meet PCI MNL 128 standard

IBC Chapter 19

CONCRETE (Cont'd)

- Durability requirements (Section 1904)
  - Water-cementitious materials ratio
    - ACI 318
  - Freezing and thawing exposures
    - Air entrainment
    - Concrete Properties
      - Exception for Group R occupancies less than 4 stories in height -- can use table 1904.2.2
  - Corrosion protection of reinforcement (ACI 318)

IBC Chapter 19

CONCRETE (Cont'd)

- Concrete Quality, Mixing and Placing (Section 1905)
  - General (1905.1)
    - f'c shall not be less than 2,500 psi
    - No max. unless specifically restricted by code
  - Evaluation and acceptance
    - technician qualification
    - frequency of tests (ACI 318)
      - Exception if less than 50 cu. yds.
  - Curing (ACI 318)
  - Cold and hot weather requirements (ACI 318)

IBC Chapter 19

CONCRETE (Cont'd)

- Formwork, embedded pipes and construction joints (Section 1906)
- Details of reinforcement (Section 1907)
  - Hooks
  - Bending
  - Placing Reinforcement
    - Concrete Cover – ACI section 7.7.1

7.7 — Concrete protection for reinforcement

7.7.1 — Cast-in-place concrete (nonprestressed)

The following minimum concrete cover shall be provided for reinforcement, but shall not be less than required by 7.7.5 and 7.7.7:

	Minimum cover, in.
a) Concrete cast against and permanently exposed to earth	3
b) Concrete exposed to earth or weather:	
No. 6 through No. 18 bars	2
No. 5 bar, W31 or D31 wire, and smaller	1-1/2
c) Concrete not exposed to weather or in contact with ground:	
Slabs, walls, joists:	
No. 14 and No. 18 bars	1-1/2
No. 11 bar and smaller	3/4

CONCRETE (Cont'd)

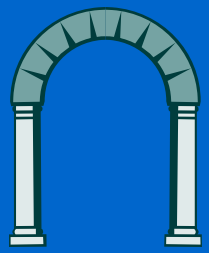
- Modifications to ACI 318 (Section 1908)
- Structural Plain Concrete (Section 1909)
  - Scope.

    The design and construction of structural plain concrete, both cast-in place and precast, shall comply with the min. requirements of Section 1909 and ACI 318 Chapter 22, as modified in Section 1908.

IBC Chapter 19

- **Structural Plain Concrete (Section 1909) (cont'd)**
  - **Limitations**

1. Members that are continuously supported by soil, such as walls and footings, or by other structural members capable of providing continuous vertical support.



2. Members for which arch action provides compression under all conditions of loading.

3. Walls and pedestals.

IBC Chapter 19

- **Structural Plain Concrete (Section 1909) (cont'd)**

  - **Joints, Design, Precast members (ACI 318)**

  - **Walls**

    - **Basement wall thickness shall not be less than 7 1/2".**

IBC Chapter 19

- **Structural Plain Concrete (Section 1909) (cont'd)**
  - **Other walls**
    - **Bearing wall thickness not less than 1/24 of unsupported height or length, whichever is shorter, but not less than 5 1/2".**
  - **Openings in walls**
    - **At least 2 #5 bars must be provided around openings extending at least 24" beyond opening.**

IBC Chapter 19

CONCRETE (Cont'd)

- Seismic Design Provisions (Section 1910)
- Minimum Slab Provisions (Section 1910)
  - General
    - The thickness of concrete floor slabs supported directly on the ground shall not be less than 3 1/2".
    - A 6-mil polyethylene vapor retarder with joints lapped not less than 6 inches, or equivalent vapor retarder, shall be placed between the base course or subgrade and the concrete floor slab.
    - Exceptions for vapor retarder

IBC Chapter 19

CONCRETE (Cont'd)

- Anchorage to Concrete - ASD (Section 1911)
- Anchorage to Concrete - SD (Section 1912)
- Shotcrete (Section 1913)
- Reinforced Gypsum concrete (Section 1914)
- Concrete-Filled Pipe Columns (Section 1915)

IBC Chapter 20

ALUMINUM

- **Aluminum must comply with the design requirements of AA ASM 35 -00 and AA ADM 1 -00.**

- **Nominal loads minimum required by Chapter 16.**

IBC Chapter 21

MASONRY

- General (IBC Section 2101)
  - Identifies Acceptable Design Methods
- Definitions and Notations (IBC Section 2102)
  - Area
  - Autoclaved Aerated Concrete (AAC)
  - Brick
  - Dimensions
  - Masonry
  - Masonry units
  - Column
  - Wall

IBC Chapter 21

MASONRY (cont'd)

- Construction Materials (IBC Section 2103)
  - *Wisconsinism (Comm 62.2103)*

    Added a definition for the term "cast stone masonry unit"

  - AAC Masonry/Concrete - ASTM C 1386 (IBC 2103.3)
  - Mortar - ASTM C 270 (IBC 2103.8)
  - Grout - ASTM C 476 (IBC 2103.12)
  - Metal Reinforcement (IBC 2103.13)

IBC Chapter 21

MASONRY (cont'd)

- Construction (IBC Section 2104)
  [ACI 530.1/ASCE 6/TMS 602-05]
  - Tolerances (ACI 530.1)
  - Placing mortar and units
  - Installation of wall ties
  - Support on wood -- per IBC s. 2304.12
  - Weep holes – 33" o.c., Min. 3/17" dia. (s. 2104.1.8)
  - Corbeled masonry
  - Cold and hot weather construction (s. 2104.3 and .4)
    - Spelled out in IBC

IBC Chapter 21

MASONRY (cont'd)

- Quality Assurance (IBC Section 2105)

- Seismic Design [ACI 530/ASCE 5]
  (IBC Section 2106)

- Allowable Stress Design [ACI 530/ASCE 5]
  (IBC Section 2107)

  - Prescriptive allowance for masonry columns in seismic design categories A, B or C.

- Strength Design [ACI 530/ASCE 5]
  (IBC Section 2108)

IBC Chapter 21

MASONRY (cont'd)

- **Empirical Design (IBC Section 2109)**
  - **General**
    - Design based on this section or Chapter 5 of ACI 530/ASCE 5
    - Lintels designed through structural analysis

IBC Chapter 21

MASONRY (cont'd)

- **Empirical Design (IBC Section 2109)**
  - Limitations
    - Shall not be used for the following:

      1. Buildings assigned certain seismic design categories.
      2. Lateral-force-resistant system (LFRS) elements for wind speed over 110 MPH.
      3. Non-SFRS interior element in enclosed building over 180 ft. in ht. and wind speed greater than 110 mph.

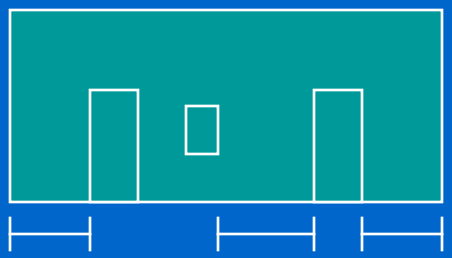
IBC Chapter 21

- **Empirical Design (IBC Section 2109)**
  - Limitations (Cont'd)
    - Shall not be used for the following:

      4. Non-SFRS exterior element above 35 ft. in building over 180 ft. in ht.
      5. Exterior elements that are less than 35 ft. above where wind speed exceeds 110 mph.
      6. Gravity load not within center third of wall thickness.
      7. AAC masonry.

IBC Chapter 21

- **Empirical Design (IBC Section 2109) (cont'd)**
  - **Lateral Stability**



- **Cumulative length of shear walls**
- **Maximum Diaphragm ratio (Table 2109.2.1.2)**

TABLE 2109.2.1.2
DIAPHRAGM LENGTH-TO-WIDTH RATIOS

FLOOR OR ROOF DIAPHRAGM CONSTRUCTION	MAXIMUM LENGTH-TO-WIDTH RATIO OF DIAPHRAGM PANEL
Cast-in-place concrete	5:1
Precast concrete	4:1
Metal deck with concrete fill	3:1
Metal deck with no fill	2:1
Wood	2:1

IBC Chapter 21

- **Empirical Design (IBC Section 2109) (cont'd)**

  - **Compressive stress requirements**
    - **IBC Table 2109.3.2**

  - **Lateral support**
    - **Table 2109.4.1**

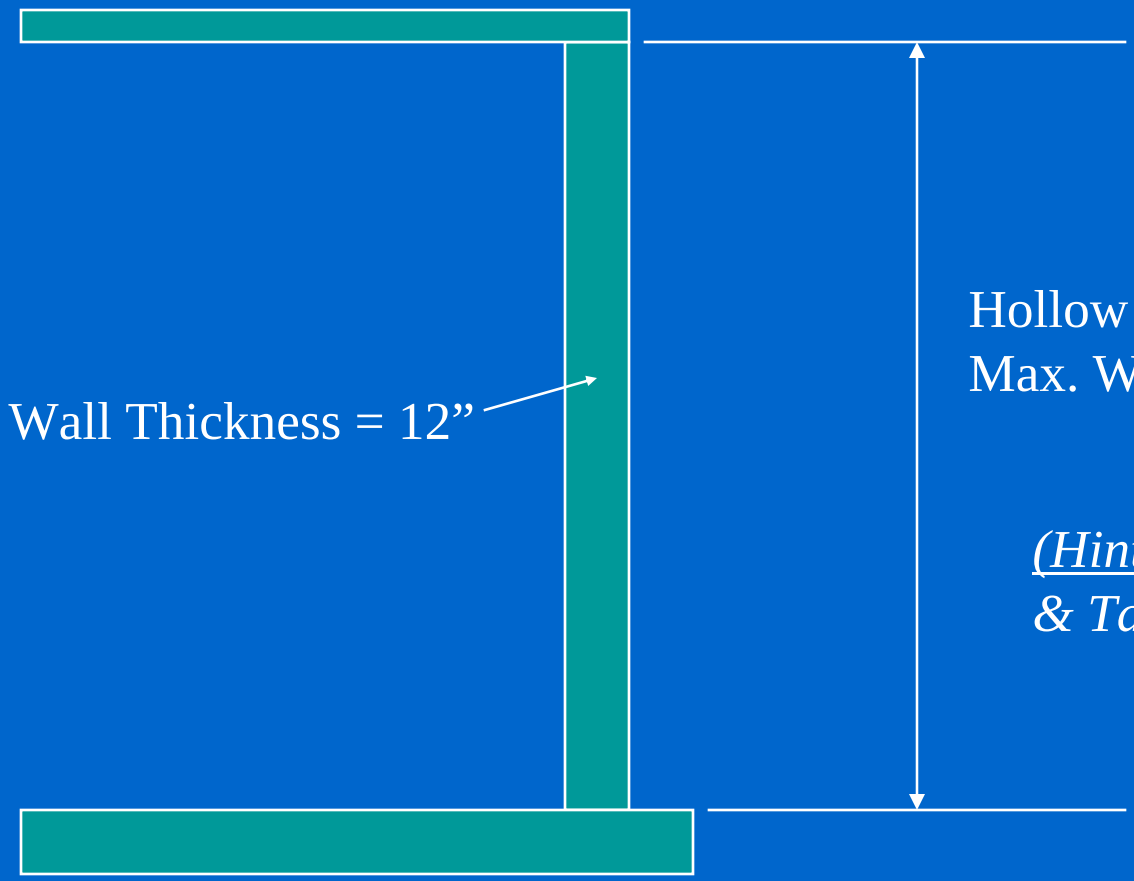
  - **Opening Limits - Comm Table 62.2109-1**

  - **Thickness --- based on nominal thickness and on sum of muti-wythe wall nominal thicknesses**

  - **Method of support**

TABLE 2109.4.1
WALL LATERAL SUPPORT REQUIREMENTS

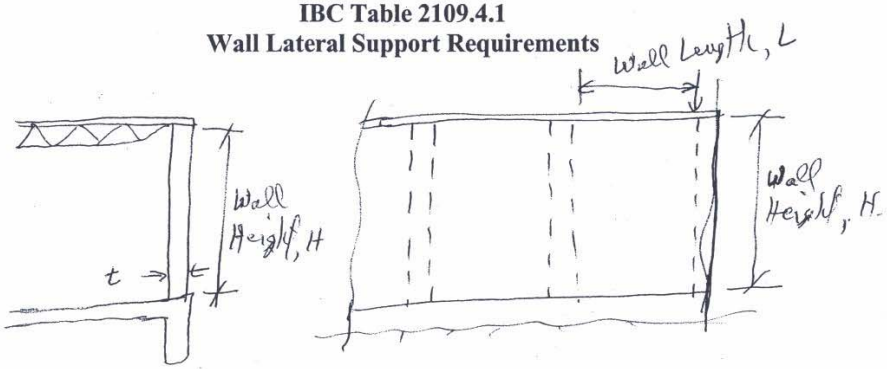
CONSTRUCTION	MAXIMUM WALL LENGTH TO THICKNESS OR WALL HEIGHT TO THICKNESS
Bearing walls	
Solid units or fully grouted	20
All others	18
Nonbearing walls	
Exterior	18
Interior	36



Hollow core unit bearing wall
Max. Wall Height = ?

(Hint: See IBC 2109.5.2 & Table 2109.4.1)

IBC Table 2109.4.1
Wall Lateral Support Requirements



$$\frac{\text{Wall Height}}{\text{Wall Thickness}} \quad \text{or} \quad \frac{\text{Wall Length}}{\text{Wall Thickness}} \leq \text{Value in Table}$$

Example 1:

H/t = 18, t = 12"

Maximum H = 18 t
= 18 x 12"
= 216" or 18'

Example 2:

Ratio from Table = 18, Wall Height = 14'

What is the minimum wall thickness?

H/t = 18

H = 18 x t

t = H/18

t = 14' x 12"/' divided by 18

= 9.33"

L. Suzzi
7/28/03

IBC Chapter 21

- **Empirical Design (IBC Section 2109) (cont'd)**

  - **Min. Thickness of Masonry (Section IBC 2109.5)**

  - **Bearing walls: more than one story 8" and one story 6"**

  - **Shear walls: 8"**

  - **Foundation walls: 8" and as required by 2109.5.3**

  - **Foundation wall requirements of 2109.5.3**
    - **Per IBC Table 2109.5.3.1**
    - **Per IBC Section 1805.5**

IBC Chapter 21

- **Empirical Design (IBC Section 2109) (cont'd)**
  - **Anchorage (2109.7)**
    - **Intersecting walls - may use one of the methods listed**
    - **Floor and roof anchorage**
      - **Wood floor joist = 6' max o.c. w/strap**
      - **Steel floor joist = 6' max o.c. w/3/8" round bar**
      - **Roof diaphragm = 6' max o.c. w/1/2" bolts embedded 15" or wrapped around bond beam rebar**
    - **Walls adjoining structural**
      - **½" bolts spaced 48" o.c. embedded 4" into masonry**
  - **Adobe construction (2109.8)**
  - **Wisconsin section on jointing added**
    - **Comm 62.2109 (3) and Table Comm 62.2109-2**

MASONRY - Wisconsinisms

Table 62.2109–1
Maximum Ratio of Laterally Unsupported Height or Length to Thickness for Exterior Walls With Openings†

Type of Masonry	Percent of Openings at Any Horizontal Plane of Wall			
	20	40	60	Over 60
Single wythe walls of solid or grouted walls of solid units	20	16	12	Submit design
All other masonry	18	14	10	calculations

†The percentage of openings shall be calculated for each 100 lineal feet of wall or portion thereof at any horizontal plane of wall.

Table 62.2109–2
Maximum Spacing Of Exterior Masonry Movement Joints Between Unrestrained Ends† (Feet)

Loading Conditions	Type of Material	Openings (Percent of Total Wall Area)			
		0 to 20		More than 20	
		Joint to Joint	Joint to Corner	Joint to Joint	Joint to Corner
Load–bearing	Clay units	140	70	100	50
	Concrete units	60	30	40	20
Nonload–bearing walls	Clay units	100	50	60	40
	Concrete units	50	25	30	20

†Jointing required is a minimum and is not intended to prevent minor cracking. The distances given for maximum spacing of joints are for a single wall plane. For composite walls, the maximum spacing of joints shall be governed by the masonry material type used in the exterior wythe.

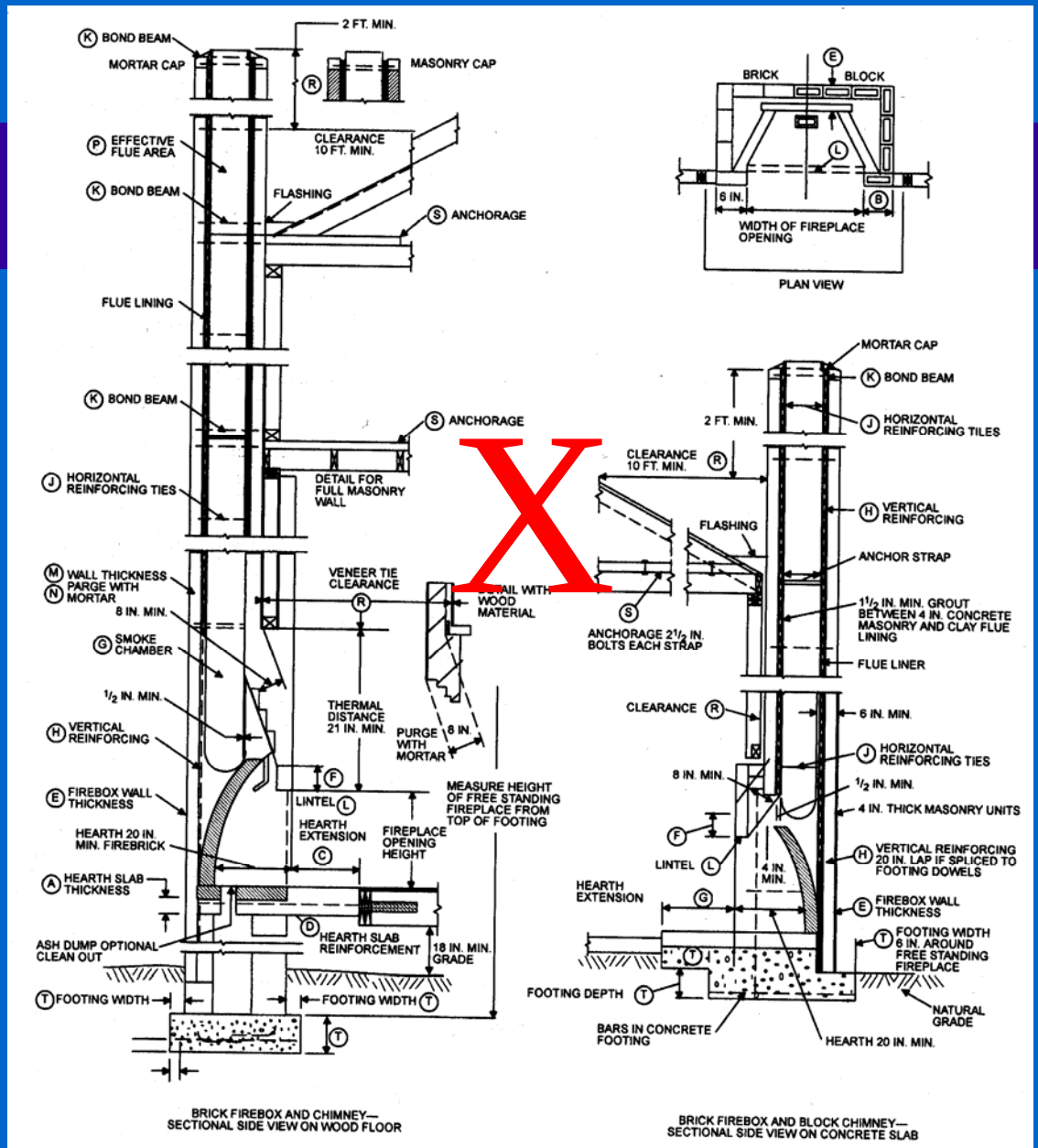
IBC Chapter 21

MASONRY (cont'd)

- Glass Unit Masonry (IBC Section 2110)
- Masonry Fireplaces (IBC Section 2111)
  - Summary of requirements in Table 2111.1
  - Note: 2" clearance to combustibles (2111.11)
- Masonry Heaters (IBC Section 2112)
- Masonry Chimneys (IBC Section 2113)

TABLE 2111.1
SUMMARY OF REQUIREMENTS FOR MASONRY FIREPLACES AND CHIMNEYS[a]

ITEM	LETTER	REQUIREMENTS	SECTION
Hearth and hearth extension thickness	A	4-inch minimum thickness for hearth, 2-inch minimum thickness for hearth extension.	2111.9
Hearth extension (each side of opening)	B	8 inches for fireplace opening less than 6 square feet. 12 inches for fireplace opening greater than or equal to 6 square feet.	2111.10
Hearth extension (front of opening)	C	16 inches for fireplace opening less than 6 square feet. 20 inches for fireplace opening greater than or equal to 6 square feet.	2111.10
Firebox dimensions	D	20-inch minimum firebox depth. 12-inch minimum firebox depth for Rumford fireplaces.	2111.11
Hearth and hearth extension reinforcing	D	Reinforced to carry its own weight and all imposed loads.	2111.9
Thickness of wall of firebox	E	10 inches solid masonry or 8 inches where firebrick lining is used.	2111.5
Distance from top of opening to throat	F	8 inches minimum.	2111.7
Smoke chamber wall thickness dimensions	G	6 inches lined, 8 inches unlined. Not taller than opening width; walls not inclined more than 45 degrees from vertical for prefabricated smoke chamber linings or 30 degrees from vertical for corbeled masonry.	2111.8
Chimney vertical reinforcing	H	Four No. 4 full-length bars for chimney up to 40 inches wide. Add two No. 4 bars for each additional 40 inches or fraction of width, or for each additional flue.	2111.3.1, 2113.3.1
Chimney horizontal reinforcing	J	$^1/_4$-inch ties at each 18 inches, and two ties at each bend in vertical steel.	2111.3.2, 2113.3.2
Fireplace lintel	L	Noncombustible material with 4-inch bearing length of each side of opening.	2111.7
Chimney walls with flue lining	M	4-inch-thick solid masonry with $^5/_8$-inch fireclay liner or equivalent. $^1/_2$-inch grout or airspace between fireclay liner and wall.	2113.10, 2113.11, 2113.12
Effective flue area (based on area of fireplace opening and chimney)	P	See Section 2113.16.	2113.16
Clearances	R		

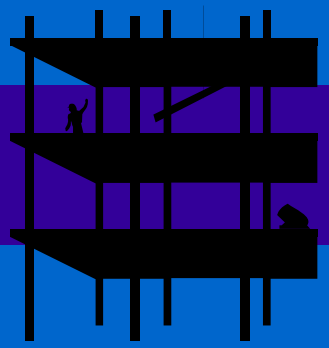


For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE 2111.1
FIREPLACE AND CHIMNEY DETAILS

IBC Chapter 22

STEEL



- General (IBC Section 2201)
- Definitions and Nomenclature (IBC Section 2202)
- Identification and Protection (IBC Section 2203)

IBC Chapter 22

STEEL (cont'd)

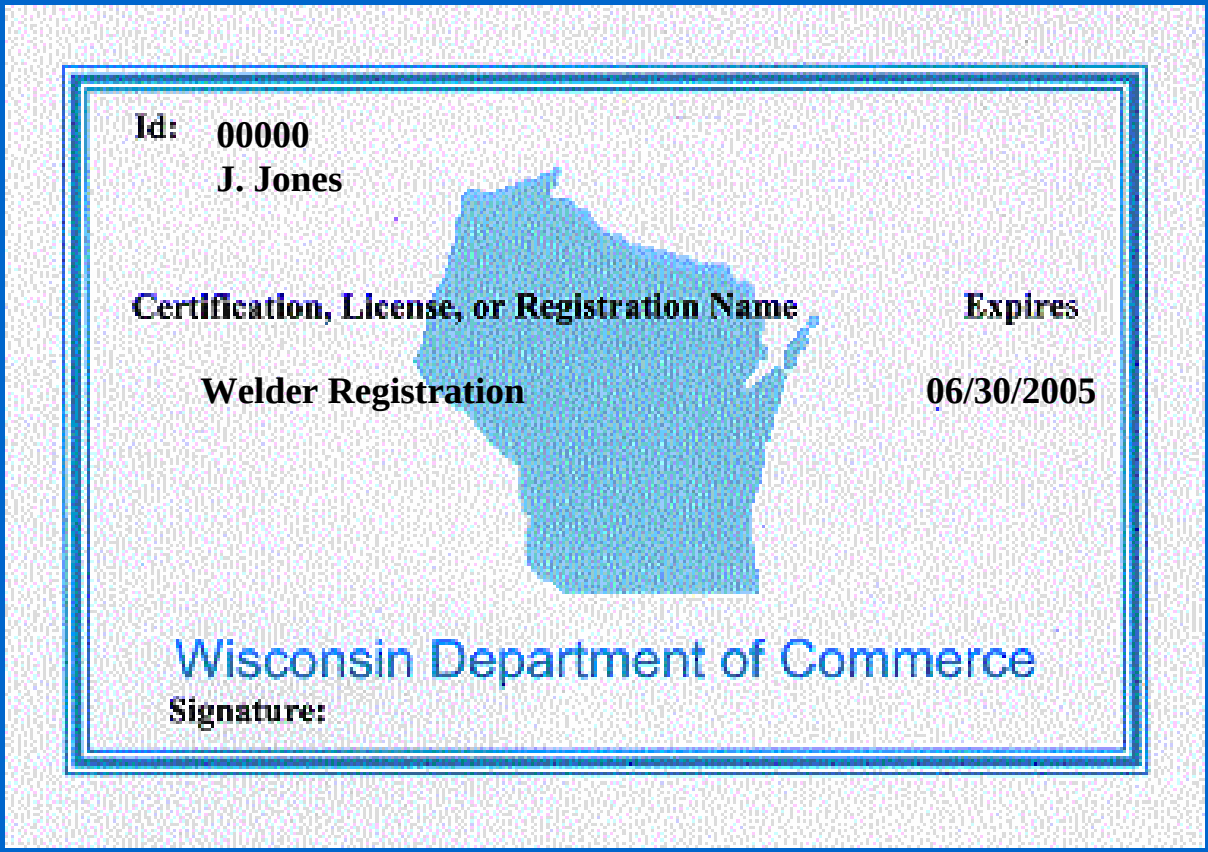
- Connections (IBC Section 2204)
  - Welding
    - AWS D 1.1 & 1.2
    - Footnote to Wisconsin Welder certification
  - Bolting

COMM 5 WELDER CREDENTIALS

You need to ask for 2 documents

- Credential card
- Certificate of Competency Structural Steel Welding card

Credential card



Certificate of Competency Structural Steel Welding card

This certifies that: (Welder's Name)			Specification No.:	Process:	Base Material Group:
Social Security No.:	Welder Symbol		Employer	Address, City, Zip	
Welder's Signature					
Has passed the required welder qualification test. Extent of limitations listed below and at right.			Filler Material: SFA Group		Thickness Range
Weld Position Qualified:			Groove Limited:	☐ 1-G ☐ 2-G ☐ 3-G ☐ 4-G	
☐ 1-G ☐ 2-G ☐ 3-G ☐ 4-G			Fillet Limited:	☐ 1-F ☐ 2-F ☐ 3-F ☐ 4-F	
Expiration Date			Pipe tubing:	☐ Thru 4"	☐ Over 4"
Test Conducted By: (WTC Name)	WTC Credential No.		Positions Qualified:	☐ All Backing ☐ Yes	☐ No

Above is the Certificate of Competency Structural Steel Welding card. Complete and present the card to the person who passed the weld test proof of competency.

IBC Chapter 22

STEEL (cont'd)

- Structural Steel Construction (IBC Section 2205)
  - AISC – 360 -05
    - LRFD
    - ASD
    - HSS
    - Seismic

IBC Chapter 22

STEEL (cont'd)

- Steel Joists (IBC 2206)
  - SJI-05 specifications
- Steel Cable Structures (IBC 2207)
  - ASCE 19-96
- Steel Storage Racks Storage (IBC 2208)
  - RMI-02 Specifications for the Design, Testing and Utilization of Industrial Steel Storage Racks

IBC Chapter 22

STEEL (cont'd)

- Cold-Formed Steel (IBC 2209)
  - AISI-NAS-01
  - ASCE 8-02 for stainless
  - IBC 2210 for light framed construction
  - ASCE 3-91 for composite slabs on steel decks

- Cold-Formed Steel Light-Framed Construction (IBC 2210)
  - AISI-General-04 and AISI-NAS-01
  - AISI-Header-04 for headers
  - AISI-Truss-04 for trusses
  - AISI-WSD-04 for wall studs
  - AISI-Lateral-04 for lateral design

IBC Chapter 23

WOOD

- General Design Requirements (IBC Section 2301)
- Allowable Stress Design [ASD] (IBC Section 2306)
- Load and Resistance Factor Design [LRFD] (IBC Section 2307)
- Conventional Light-Frame Wood Construction (IBC Section 2308)

IBC Chapter 23

WOOD (cont'd)

- Definitions
  - Conventional light-framed wood construction
  - Cripple wall
  - Diaphragm
  - Fiberboard
  - Naturally durable wood
  - Oriented strand board (OSB)
  - Particle board
  - Plywood
  - Shear wall
  - Tie-down (Hold- down)

IBC Chapter 23

WOOD (cont'd)

- Minimum Standards and Quality (IBC Section 2303)
  - General (2303.1)
    - Lumber
    - I-joists
    - Glue Lam
    - Structural Panel
    - Fiberboard
    - Hardboard
    - Particle board
    - Preservative -treated wood
      - Identification (2303.1.8.1)
    - Structural composite lumber
    - Structural log members (new)

- Minimum Standards and Quality (IBC Section 2303) (cont'd)
  - Fire-retardant-treated wood (2303.2)
    - Flame spread index of 25 or less
    - Labeled
    - Strength adjustments
    - Where exposed to weather, or damp or wet locations shall be identified as "Exterior".
  - Trusses (2303.4)
  - Nails and staples (2303.6)
    - Minimum average bending yield strength for various shank diameters.

IBC Chapter 23

WOOD (cont'd)

- General Construction Requirements (IBC Section 2304)
  - Size of structural members (2304.2)
    - Computations based on actual dimensions
  - Wall framing (2304.3)
    - Studs bear on 2" nom. thickness plate or sill
    - Headers, etc over openings in load-bearing walls
  - Framing around flues and chimneys (2304.5)
    - Combustible framing 2" min from flues, chimneys and fireplaces and 6" from flue openings

- General Construction Requirements (Section 2304) (cont'd)
  - Wall sheathing (2304.6)
    - If exposed to exterior labeled for exterior use
    - Min. thickness in Table 2304.6
  - Floor and roof sheathing (2304.7)
    - If meet provisions in applicable Tables 2304.7 (1) to (5) deemed to meet the provisions of this section.
  - Lumber Decking (2304.8)

• General Construction Requirements (Section 2304) (cont'd)

- Connections and fasteners (2304.9)
  - IBC Table 2304.9.1
  - •Fasteners in preservative treated wood
    - •Hot dipped zinc-coated galvanized steel, stainless steel, silicon bronze or copper. The coating weights for zinc-coated fasteners shall be in accordance with ASTM A 153.
    - •Exceptions.
- Heavy Timber construction (2304.10)

• General Construction Requirements (cont'd)

- Protection against decay and termites (IBC 2304.11)

  - Wood joists or bottom of wood structural floors within 18" of exposed ground in crawl spaces or unexcavated areas located within perimeter of building foundation.

  - Wood girder within 12" of exposed ground in crawl spaces or unexcavated areas located within perimeter of building foundation.

  - Wood framing, including wood sheathing, which rests on exterior foundation wall within 8" of exposed earth.

- General Construction Requirements
  - Protection against decay and termites (cont'd)
    - Wood framing members and furring strips attached directly to interior of below grade exterior masonry or concrete walls
    - Sleepers and sills on concrete or masonry slab in direct contact with earth
    - Girders resting on exterior masonry or concrete wall with less than 1/2" air space at end. Note that Wisconsin also requires the ends be provided with moisture barrier.

- General Construction Requirements
  - Protection against decay and termites (cont'd)
    - Wood siding within 6" of earth on the building exterior
    - Posts and columns resting on concrete slab or footing in direct contact with earth w/ some exceptions
    - Structural glue lams exposed to weather not fully protected by a roof
    - Wood in contact with the ground or fresh water.
    - Exposed structural supporting members of buildings, balconies, porches or similar permanent building appurtenances

• General Construction Requirements (cont'd)

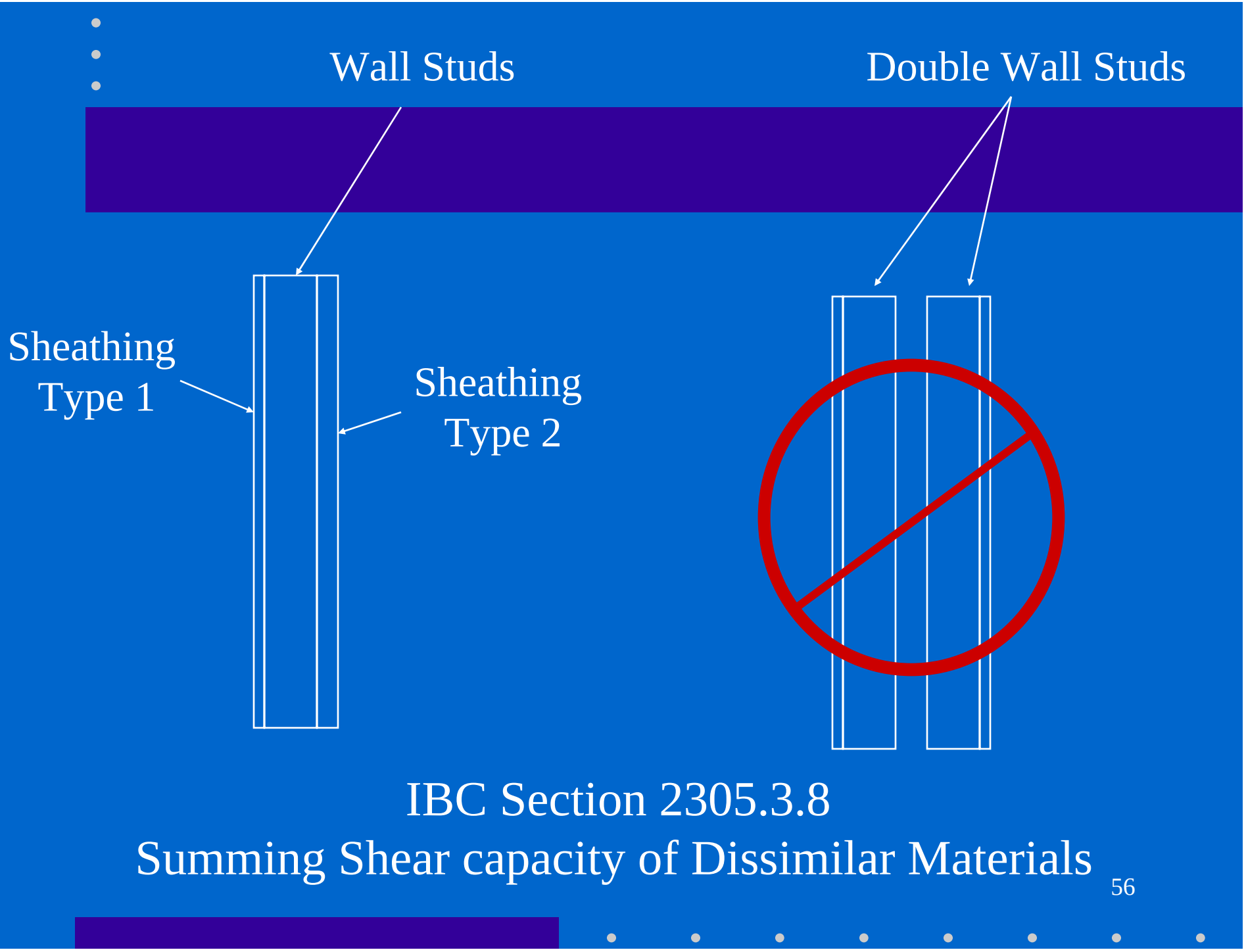
- Long term loading (IBC 2304.12)
  - Wood members supporting masonry or concrete shall be checked for long term loading.
    - Exception: Horizontal wood members supporting masonry or concrete nonstructural floor or roof surfacing not more than 4 inches thick need not be checked for long-term loading.

IBC Chapter 23

WOOD (cont'd)

Lateral Force Resisting Systems (IBC Section 2305)

- Wood diaphragm (IBC Section 2305.2)
  - Aspect ratio (IBC Section 2305.2.3 & Table 2305.2.3)
- Shear wall (IBC Section 2305.3)
  - Aspect ratio (IBC Section 2305.3.3 & Table 2305.3.4)
  - Without openings
  - With openings
- Summing shear capacities of dissimilar materials (IBC Section 2305.3.9)



IBC Section 2305.3.8
Summing Shear capacity of Dissimilar Materials

IBC Chapter 23

WOOD (cont'd)

Allowable Stress Design (IBC Section 2306)

- Applicable standards (IBC 2306.1)
  - AF&PA NDS-05
  - AITC
  - ASAE
    - EP 486.1 Shallow post foundation
  - APA
  - TPI-05

IBC Chapter 23

WOOD (cont'd)

Allowable Stress Design (IBC Section 2306) (cont'd)

- Wall stud bending stress increase permitted (IBC 2306.2)

- Wood diaphragms (IBC 2306.3)
  - Allowable shear capacities from tables shall be increased 40 percent for wind design. (2306.3.2)

- Shear walls (IBC 2306.4)
  - Allowable shear capacities from tables shall be increased 40 percent for wind design. (2306.4.1)

IBC Chapter 23

WOOD (cont'd)

Allowable Stress Design (IBC Section 2306)

- Allowable shear wall materials
  - Structural panel
  - Lumber
  - Particleboard
  - Fiberboard
  - Lath and plaster
  - Gypsum board

IBC Chapter 23

WOOD (cont'd)

- **Conventional Light-Frame Wood Construction (IBC Section 2308)**

Limitation of use:

- **Max. 3 stories above grade**
- **Max. 10 ft. floor-to-floor height plus floor framing not to exceed 16"**
- **Max. average dead load of 15 PSF**
- **Max. floor design live load of 40 PSF**
- **Max. ground snow load of 50 PSF**
- **Max. wind speed of 100 MPH**
- **Max. roof truss/rafter span of 40 ft.**

IBC Chapter 23

WOOD (cont'd)

- **Conventional Light-Frame Wood Construction (IBC Section 2308)**
  - **Braced wall lines (2308.3)**
  - **Design of portions (2308.4)**
  - **Connections and fasteners (2308.5)**
  - **Foundation plates or sills (2308.6)**
  - **Girders (2308.7)**
  - **Floor joists (2308.8)**
  - **Wall framing (2308.9)**
  - **Roof and ceiling framing (2308.10)**
  - **Additional requirements for seismic design category B or C buildings (2308.11)**

- **Conventional Light-Frame Wood Construction** (cont'd)
  - Tables
    - Floor joist spans (2308.8 (1) & (2))
    - Size, height and spacing of studs (2308.9.1)
    - Braced wall panels (2308.9.3 (1))
    - Plywood panel siding (2308.9.3 (2))
    - Structural panel wall sheathing (2308.9.3 (3))
    - Allowable shear values for particleboard sheathing (2308.9.3 (4))

- **Conventional Light-Frame Wood Construction** (cont'd)
  - Tables (cont'd)
    - Hardboard siding (2308.9.3 (5))
    - Header and girder spans, exterior walls (2308.9.5)
    - Header and girder spans, interior walls (2308.9.6)
    - Uplift connector ratings (2308.10.1)

- **Conventional Light-Frame Wood Construction** (cont'd)
  - Tables (cont'd)
    - Ceiling joist spans (2308.10.2 (1) & (2))
    - Rafter spans (2308.10.3 (1) to (6))
    - Rafter tie connections (2308.10.4.1)
    - Allowable Spans for 2-inch T & G decking (2308.10.9)

IBC Chapter 24

GLASS AND GLAZING

- General (IBC Section 2401)
  - Governs glass, light-transmitting ceramic and light-transmitting plastic installed vertical or sloped
  - Installation of replacement glass shall be as required for new installations
- Definitions (IBC section 2402)

IBC Chapter 24

GLASS AND GLAZING (cont'd)

- General Requirements for Glass (IBC Section 2403)
  - Identification
  - Supports
  - Framing
  - Interior glazed areas
  - Louvered windows or jalousies
- Wind, Snow and Dead Loads on Glass (IBC section 2402)
  - Design of Vertical Glass - slope $\leq 15^{o}$ from vert.
  - Design of sloped glass - slope $> 15^{o}$ from vert.

IBC Chapter 24

GLASS AND GLAZING (cont'd)

- Sloped Glazing and Skylights (IBC Section 2405)
  - Allowable materials and limitations
  - Screening (2405.3)
  - Framing (2405.4)
    - In types 1 and 2 constructions noncombustible
    - Designed to support roof loads Chapter 16
    - Skylights at an angle of less than 45 degrees from horizontal plane mounted on 4" curb

IBC Chapter 24

GLASS AND GLAZING (cont'd)

- Safety Glazing (IBC 2406)
  - Shall comply with CPSC 16 CFR, Part 1201 criteria for Category I or Category II as indicated in table 2406.1.
  - Exceptions for plastic glazing, glass block and louvered windows and jalousies.
  - Identification

TABLE 2406.1
MINIMUM CATEGORY CLASSIFICATION OF GLAZING

EXPOSED SURFACE AREA OF ONE SIDE OF ONE LITE	GLAZING IN STORM OR COMBINATION DOORS (Category class)	GLAZING IN DOORS (Category class)	GLAZED PANELS REGULATED BY ITEM 7 OF SECTION 2406.2 (Category class)	GLAZED PANELS REGULATED BY ITEM 6 OF SECTION 2406.2 (Category class)	DOORS AND ENCLOSURES REGULATED BY ITEM 5 OF SECTION 2406.2 (Category class)	SLIDING GLASS DOORS PATIO TYPE (Category class)
9 square feet or less	I	I	No requirement	I	II	II
More than 9 square feet	II	II	II	II	II	II

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

- Safety Glazing (IBC 2406) (cont'd)

  - Hazardous locations

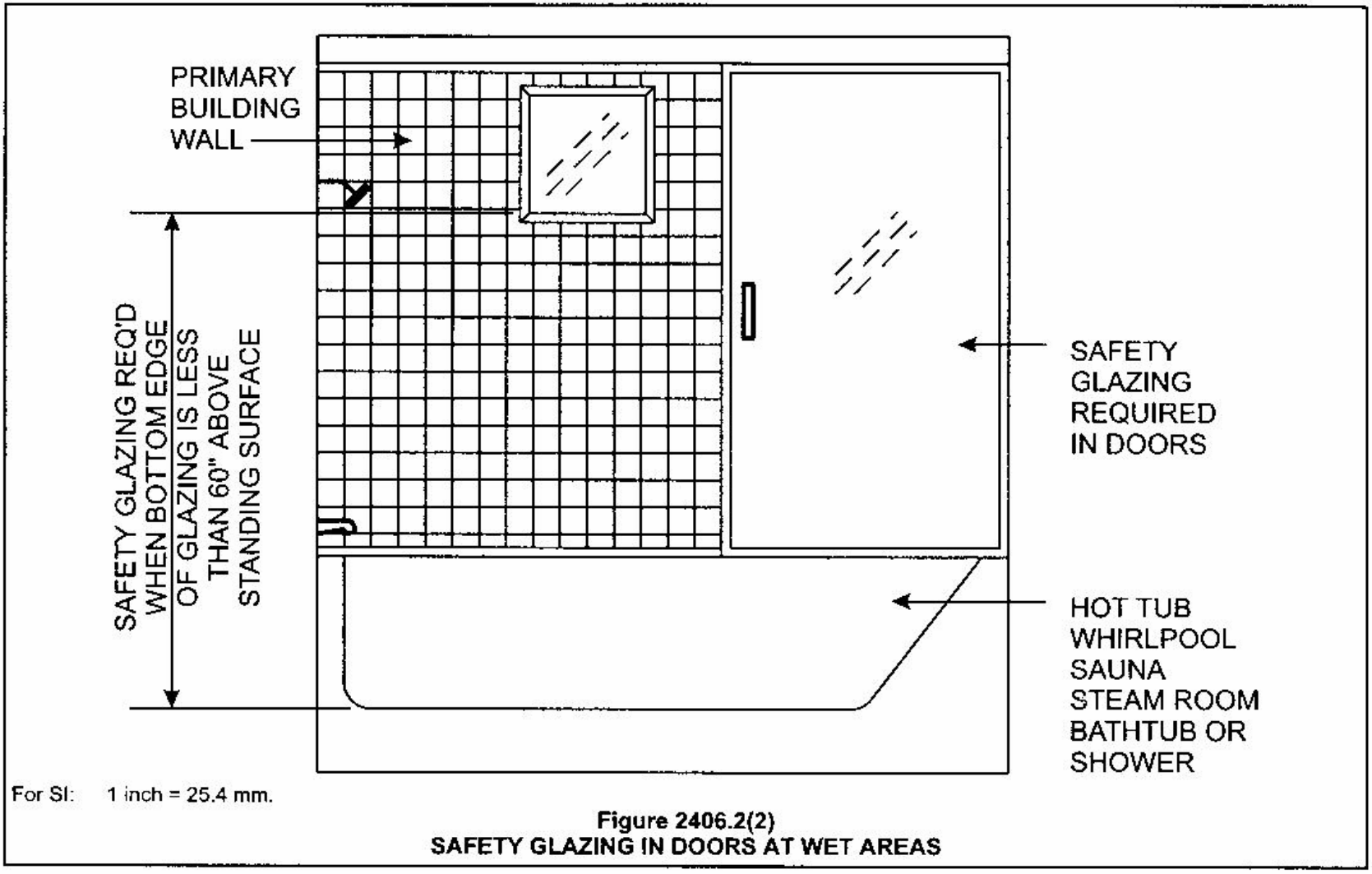
    1. Glazing in swinging doors

    2. Glazing in sliding door assemblies

    3. Glazing in storm doors

    4. Glazing in unframed swing doors

    5. Glazing in doors and enclosures for hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers. Glazing in building walls enclosing these compartments within 60" vertical of standing surface.



For SI: 1 inch = 25.4 mm.

Figure 2406.2(2)
SAFETY GLAZING IN DOORS AT WET AREAS

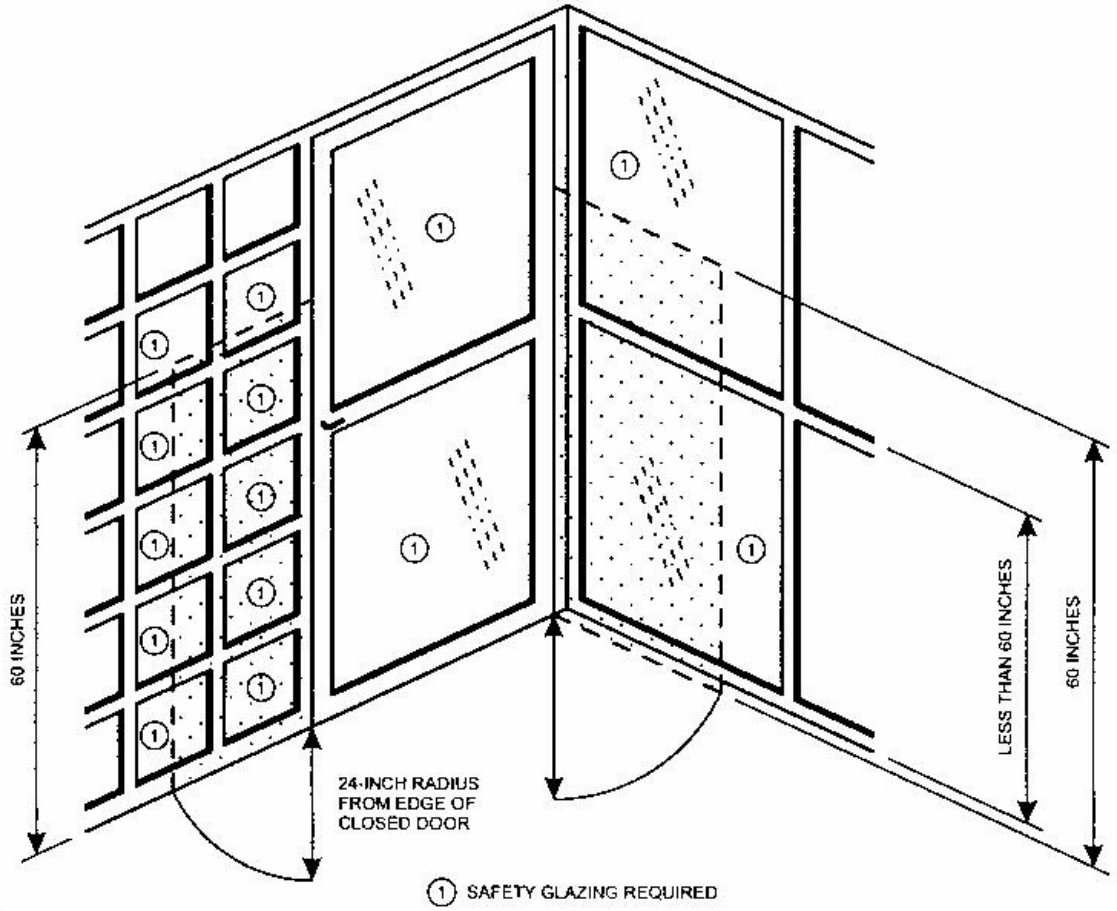
- Safety Glazing (IBC 2406) (cont'd)
  - Hazardous locations (cont'd)

6. Glazing in individual fixed or operable panel adjacent to door within 24"arc of closed door and bottom of glazing within 60" of walking surface

Exceptions:

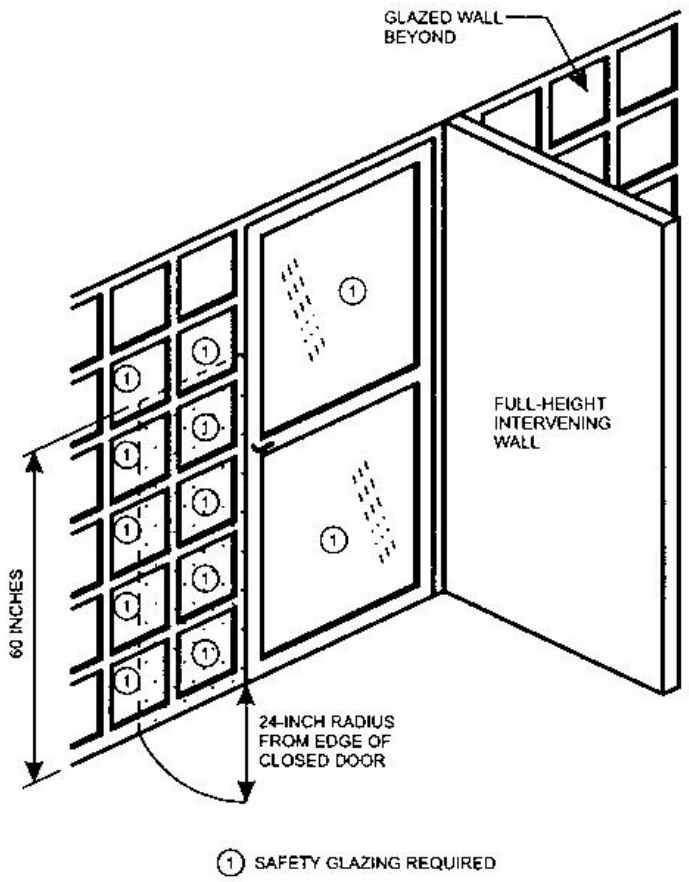
1. With intervening wall or barrier
2. Wall perpendicular to door in R-2

7. Glazing in individual fixed or operable panel, in other than 5 & 6 locations, in following locations:



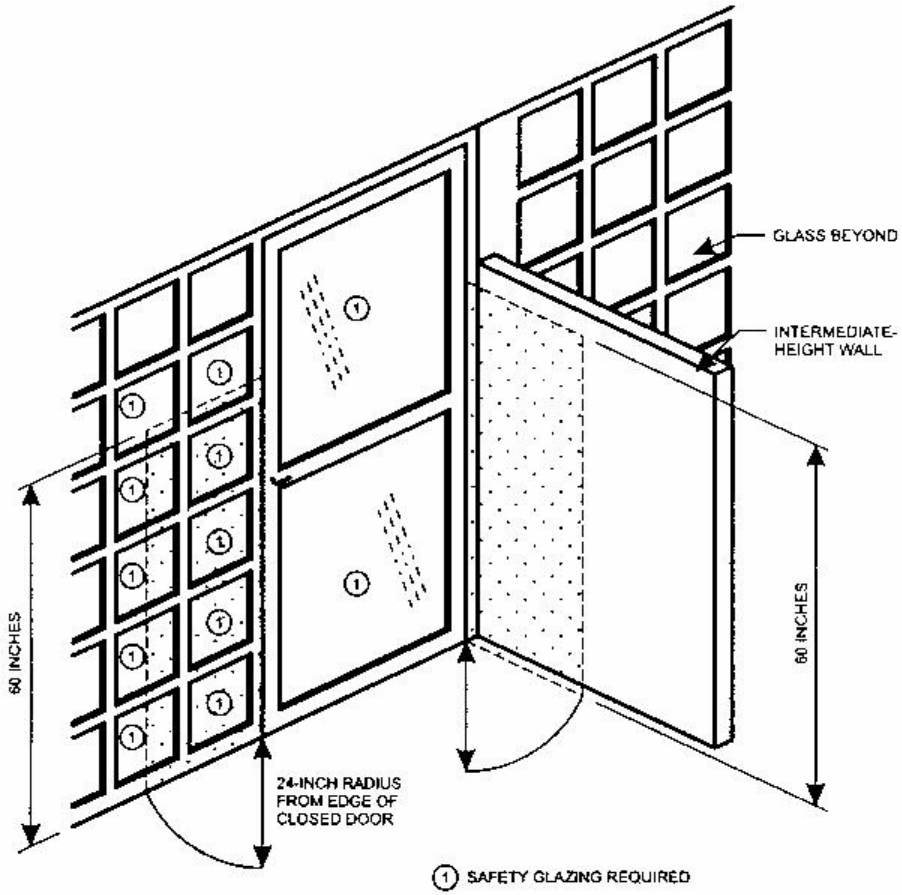
For SI: 1 inch = 25.4 mm.

Figure 2406.2(3)
SAFETY GLAZING IN CLOSE PROXIMITY TO DOORS



For SI: 1 inch = 25.4 mm.

Figure 2406.2(4)
SAFETY GLAZING AT FULL-HEIGHT INTERVENING WALL



For SI: 1 inch = 25.4 mm.

Figure 2406.2(5)
SAFETY GLAZING AT INTERMEDIATE-HEIGHT INTERVENING WALL

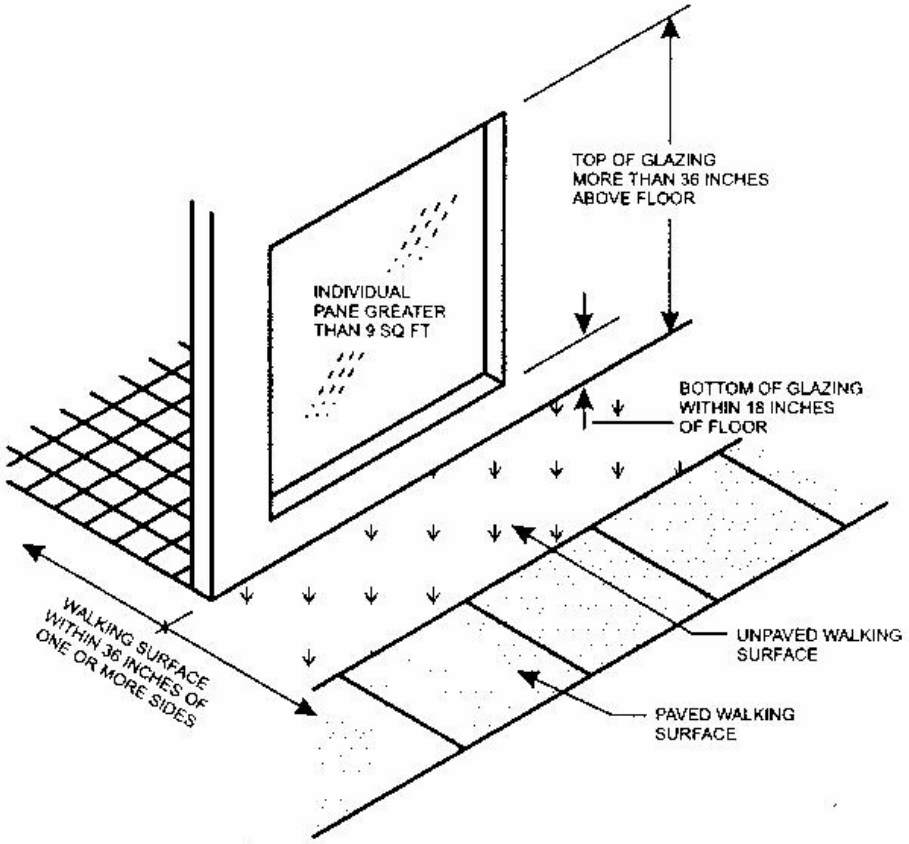
- Safety Glazing (IBC 2406) (cont'd)
  - Hazardous locations (cont'd)

    7. Glazing in individual fixed or operable panel, in other than 5 & 6 locations, in following locations:

       7.1 Individual pane > 9 sq/ ft.
       7.2 Bottom edge less than 18" above floor
       7.3 Top edge greater than 36" above floor
       7.4 One or more walking surfaces with 36" horz.

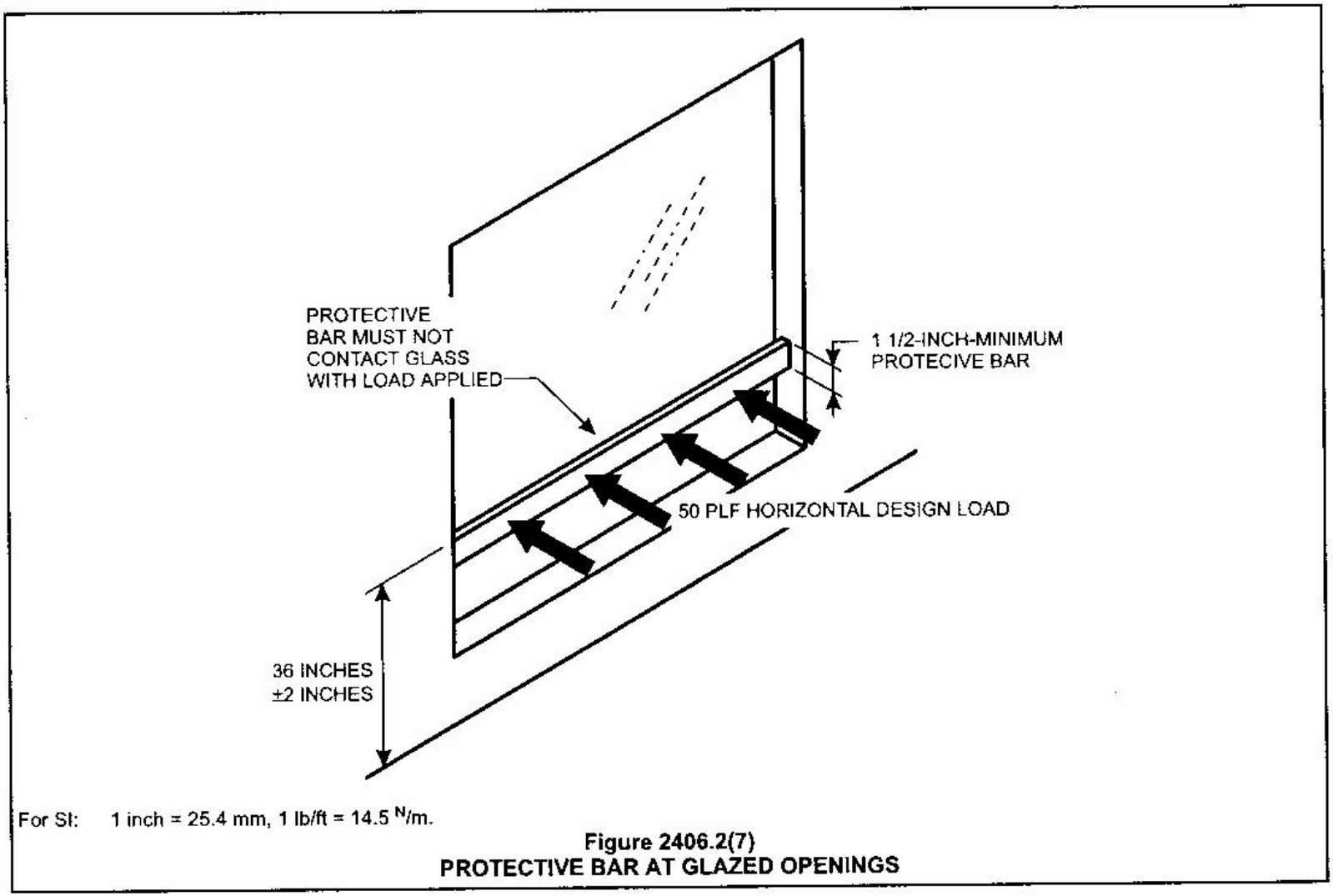
       Exceptions.
       1. Protected with a bar
       2. Bottom edge more than 25' above grade, roof, walking surface or other sloped surface

floor level. is not needed. It is only when walking surfaces are



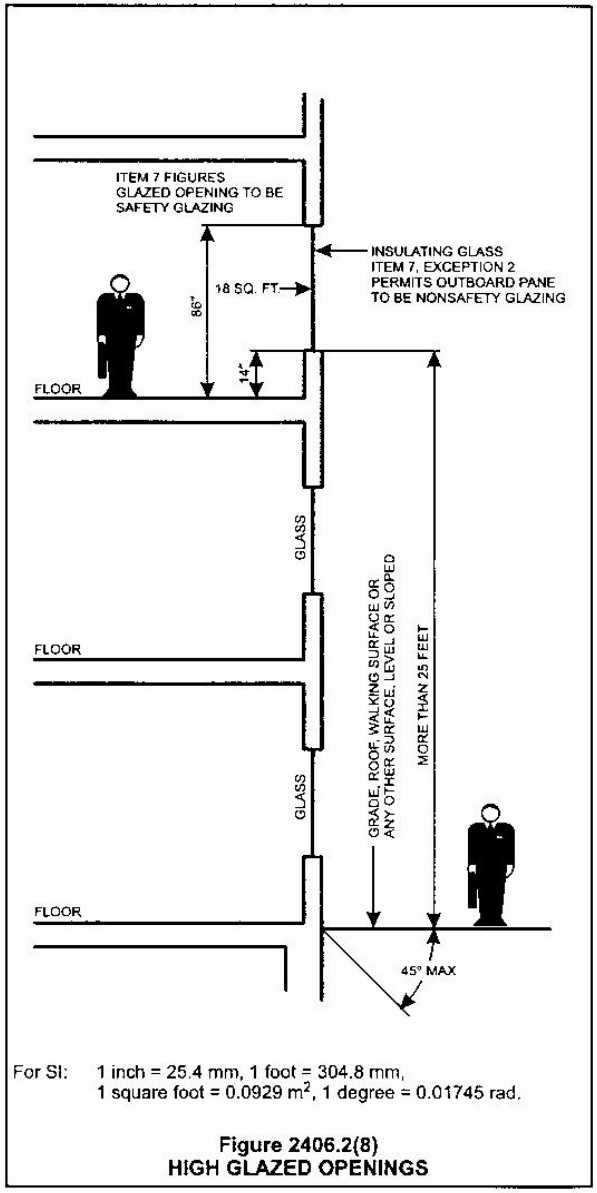
For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m^2.

Figure 2406.2(6)
FIXED OR OPERABLE GLAZED OPENING



For SI: 1 inch = 25.4 mm, 1 lb/ft = 14.5 N/m.

Figure 2406.2(7)
PROTECTIVE BAR AT GLAZED OPENINGS



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm,
1 square foot = 0.0929 m^2, 1 degree = 0.01745 rad.

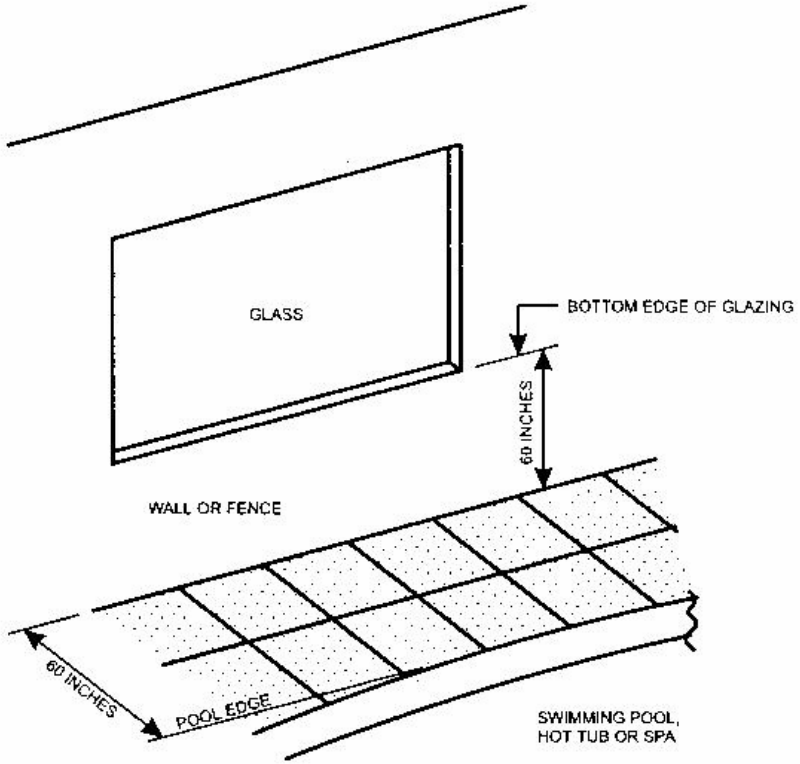
Figure 2406.2(8)
HIGH GLAZED OPENINGS

- Safety Glazing (IBC 2406) (cont'd)
  - Hazardous locations (cont'd)

    8. Glazing in guards and railings

    9. Glazing in walls and fences enclosing indoor and outdoor swimming pools, hot tubs or spas meeting all of the following conditions:

       9.1 Within 60" vertically of walking surface
       9.2 Within 60" horizontally of water's edge



For SI: 1 inch = 25.4 mm.

Figure 2406.2(9)
GLAZING IN POOL ENCLOSURE

Safety Glazing (IBC 2406) (cont'd)

- Hazardous locations (cont'd)

10. Glazing adjacent to stairways, landings and ramps where following conditions are met:

10.1 Within 36" horizontally of walking surface
10.2 Within 60" horizontally of the bottom tread of stairway in any direction
10.3 Bottom edge within 60" vertically of walking surface or stairways, measured form nose ot f the tread.

Exception:

1. Stairway, landing or ramp has guard or handrail and 2. Plane of glass is 18 inches from railing

Safety Glazing (IBC 2406) (cont'd)

- Hazardous locations (cont'd)

Exceptions (2406.2.1)

1. Openings which 3" sphere can not pass
2. Decorative glass
3. Curved glazed panels in revolving doors
4. Commercial refrigerated cabinet doors
5. Glass block
6. Louvered window and jalousies mtg. 2403.5
7. Mirrors and other glass panels with continuous backing support

IBC Chapter 24

GLASS AND GLAZING (cont'd)

- Fire department access panels (2406.3)
- Glass in Handrails and Guards (IBC Section 2407)
- Glazing in Athletic Facilities (IBC 2408)
  - Racquetball and squash courts
    - Glazing provided shall conform with CPSC 16 CFR, Part 1201 with impact loads applied at a height of 59".
  - Gymnasiums and basketball courts
    - Glazing provided shall conform with Category II, CPSC 16 CFR, Part 1201
- Glass in Elevator Hoistway (IBC 2409)

IBC Chapter 25

GYPSUM BOARD LATH AND PLASTER

- Material Requirements
- Construction Requirements
- Strength Requirements

ADDITIONAL RESOURCE DOCUMENTS

- 2000 IBC Handbook, Structural Provisions
  Available from ICBO - item #097H2K
  1-800-284-4406 or visit ww.icbo.org

- 2000 IBC Structural Q & A
  Available from ICBO - item #124S2K

- Questions and Guide to the Use of the Wind Load Provisions of ASCE 7-98
  Available from ASCE publications
  1-800-548-ASCE or visit www.pubs.asce.org

ADDITIONAL RESOURCE DOCUMENTS (cont'd)

- 2006 IBC Commentary - Volume II

  Available from all model groups around March 2002

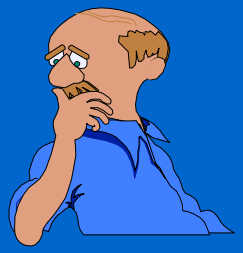
- 1997 NEHRP (BSSC) - Recommended provisions for the Development of Seismic Regulations for New Buildings and Other Structures

  Available from FEMA - request FEMA 302 & 303

  1-800-480-2520 or visit www.bssconline.org

Wisconsin
Department of Commerce

On behalf of the Wisconsin Department of Commerce, Safety and Buildings Division, we would like to thank you for your time.



Any Questions?