IBC Chapter 4

• Special Detailed Requirements Based on Use and Occupancy
Section 401 Scope

• In addition to the occupancy and construction requirements in this code, the provisions of this chapter apply to the special uses and occupancies described herein.
Section 402 Covered Mall Buildings

- Not to exceed three floor levels and meet the provisions of section 402
Section 402.2 Definitions

- Anchor Building
- Covered Mall Building
- Gross Leasable Area
- Mall
Section 402.3 Lease Plan

- Owner shall provide both building and fire official lease plan showing the location of each occupancy and its exits after certificate of occupancy issue.
Section 402.4 Means of Egress

• Each tenant shall be provided egress in accordance with this code. Where conflict...this section shall apply.
Section 402.4.1 Determination of Occupant Load

• 402.4.1.1 Occupant Load Formula
  • OLF = (0.00007)(GLA) + 25
  • Occupant Load Factor = square feet per person
Section 402.4.1 Determination of Occupant Load

• 402.4.1.2 OLF Range

• Not required to be less than 30 and shall not exceed 50

• 402.4.1.3 Anchor Buildings – Not included in mall occupant load.

• 402.4.1.4 Food Courts – Occupant load based on s. 1004
Section 402.4.2 Number of Means of Egress

- Travel distance >75 feet
- Occupant Load 50 or more
- Not less than two means of egress
Section 402.4.3 Arrangements of Means of Egress

- 402.4.3.1 Anchor building Means of Egress shall be independent.
- Malls terminating at an anchor building shall be considered dead-end.
Section 402.4.4 Distance to Exits

- 200’ from any point to an exit or entrance to mall.
- 200’ from any point within a mall to an exit.
Section 402.4.5 Access to Exits

• Travel in either direction from any point.

• Minimum 66 inch width.

• 402.4.5.1 Exit passageways from tenant spaces protected including 1-hour doors.
Section 402.5 Mall Width

• Not in accordance with 1005.1...

• 402.5.1 Minimum Width of mall shall be 20 feet with minimum 10 foot clear exit width.
Section 402.6 Types of Construction

- Construction types I, II, III and IV
- Unlimited –
- 60 foot open space
- Anchor buildings and parking garages – 3 story maximum
Section 402.7 Fire resistance-rated separation

- Not required between tenant space and mall of food court.
- Garages – Separate buildings – 2 hour
- Tenants separated by fire partitions
- Anchor buildings separated from mall by fire walls, s. 705
Section 402.8 Automatic Sprinkler System

• Equipped throughout with an automatic system in accordance with s. 903.3.1.1
Section 402.9 Smoke Control

• Smoke control shall be provided where required for atriums, s. 404
Section 402.10 Kiosks

- Non-combustible
- Fire suppression and detection
- Minimum separation of 20 feet
- Maximum area of 300 square feet
Section 402.11 Children’s Playground Structures

• Exceeding 10 feet in height and 150 square feet.
• Materials
• Fire Protection
• Separation
• Area Limits
Section 402.12 Security Grilles and Doors

- Fully open when occupied
- Openable from within
- Not more than half of required exits
Section 402.13 Standby Power

- Malls exceeding 50,000 square feet.
- Voice/alarm communication system
Section 402.14 Emergency voice/alarm systems

- Malls exceeding 50,000 square feet.
- In accordance with 907.2.12.2
Section 402.15 Plastic Signs

- Area – 20% of wall
- Height and width
- Location
- Materials
Section 402.16 FD access to equipment

- Air-Conditioning Systems
- Automatic Fire Extinguishing
- Detection
- Suppression
Section 403 High-Rise Buildings

• Occupied floor more than 75 feet above the lowest level of fire department vehicle access.
Section 403.2 Automatic Sprinkler System

• 903.3.1.1

• 903.3.5.2 Secondary Supply
Section 403.3 Reduction in fire-resistance rating

- Sprinkler control valves equipped with supervisory initiating devices and water-flow initiating devices for each floor.
Section 403.3.1 Type of Construction

- IA to IB – 420 foot maximum height / columns can not be reduced
- IB to IIA – except for F1, M and S1
- Height and Area of the reduced shall be allowed the same as the original
Section 403.3.2 Shaft Enclosure

- 1-hour Fire-resistance rating...Other than exit enclosures and hoistways
- Sprinkler head at top of shaft and alternate floor levels
Section 403.4 Emergency Escape and Rescue

• Not required as prescribed by s. 1026
Section 403.5 Automatic Fire Detection

- Smoke detection as prescribed by 907.2.12.1
Section 403.6 Emergency voice/alarm system

- Emergency Voice/Alarm as prescribed by 907.2.12.2
Section 403.7 Fire department communication system

- Two-way FD Communication system in accordance with 907.2.12.3
Section 403.8 Fire Command

• Section 911
Section 403.9 Elevators

- IBC Chapter 30
Section 403.10 Standby power

• Fire Command Center
• Fire Pumps
• Ventilation and detection – Smokeproof enclosures
• Elevators in accordance with s. 1007.4 and 3003
Section 403.11 Emergency power systems

- Exit signs and Means of Egress Illumination
- Elevator car lighting
- Emergency voice/alarm communication
- Automatic Fire Detection
- Fire Alarms
Section 403.12 Stairway door operation

• Other than exit discharge, permitted to be locked from the stairway side.

• Capable of being unlocked simultaneously from fire command center

• Two-way communication not less than every fifth floor where locked
Section 403.13 Smokeproof exit enclosure

• Every required stairway serving floors more than 75 feet above lowest level of FD access...
  • 909.20
  • 1020.1.7
Section 403.14 Seismic Considerations

• Chapter 16
Section 404 Atriums

- Other than Group H or exception 5 s. 707.2
Section 404.1.1 Definition

• An opening connecting two or more stories other than enclosed stairways, hoistways, escalators, plumbing, electrical, mechanical and not defined as a mall...stories does not include balconies or mezzanines.
Section 404.2 Use

• No uses other than low fire hazard uses unless protected by an automatic sprinkler in accordance with 903.3.1.1.
Section 404.3 Automatic Sprinkler Protection

- Entire Building
- Exceptions...
- 2-hour separation
- Ceiling is more than 55 feet above the floor
Section 404.4 Smoke Control

- Installed in accordance with s. 909
- Exception two story atriums
Section 404.5 Enclosure of Atriums

• Separated from adjacent spaces by 1-hour Barriers s. 706 and Horizontal
Section 404.6 Standby Power

- Smoke Control Equipment – 909.11
Section 404.7 Interior Finish

• Not less than Class B…
Section 404.8 Travel Distance

• Where part of the egress system the portion through the atrium shall not exceed 200’.
Section 405 Underground Buildings

• Floor level used for human occupancy more than 30 feet below the lowest level of exit discharge.
Section 405.2 Construction Requirements

- Type I

<table>
<thead>
<tr>
<th>BUILDING ELEMENT</th>
<th>TYPE I</th>
<th>TYPE II</th>
<th>TYPE III</th>
<th>TYPE IV</th>
<th>TYPE V</th>
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</thead>
<tbody>
<tr>
<td>Structural frame(^a)</td>
<td>3(^b)</td>
<td>2(^b)</td>
<td>1 0</td>
<td>1 0</td>
<td>HT</td>
</tr>
<tr>
<td>Including columns, girders, trusses</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Bearing walls</td>
<td>3 2</td>
<td>1 0</td>
<td>2 2</td>
<td>2 1</td>
<td></td>
</tr>
<tr>
<td>Exterior(^f)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interior</td>
<td>3(^b)</td>
<td>2(^b)</td>
<td>1 0</td>
<td>1 0</td>
<td>I/HT</td>
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<tr>
<td>Nonbearing walls and partitions</td>
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<td></td>
<td>See Table 602</td>
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<tr>
<td>Exterior(^g)</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Interior</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Floor construction</td>
<td>2 2</td>
<td>1 0</td>
<td>1 0</td>
<td>1 0</td>
<td>HT</td>
</tr>
<tr>
<td>Including supporting beams and joists</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roof construction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 405.3 Automatic Sprinkler System

• Highest level of exit discharge and all levels below...903.3.1.1.
Section 405.4 Compartmentation

• More than 60 feet below…minimum of two compartments extending through the highest level of exit discharge.

• Constructed as smoke barriers, section 709

• Where elevator is provided each compartment shall have direct access / elevator lobbies
Section 405.5 Smoke Control System

- Section 909
- Activation 907.2.18
Section 405.6 Fire Alarm System

• Section 907.2.19
Section 405.7 Public Address

- Section 907.2.19.1
Section 405.8 Means of Egress

• Minimum of two, one exit and one to adjoining compartment
Section 405.9 Standby Power

- Smoke control system
- Ventilation and Automatic Fire Detection for smoke proof enclosures
- Fire Pumps
- Elevators in accordance with s. 3003
- 60 second pick-up time...
Section 405.10 Emergency Power

• Emergency voice/alarm communications system
• Fire Alarm system
• Automatic Detection system
• Elevator car lighting
• Means of Egress and Exit sign illumination
Section 405.11 Standpipe System

• Section 905
Section 406 Motor-vehicle Related Occupancies
Section 406.1 Private Garages and Carports
Section 406.1.1 Classification

- Group U Classification
- Less than 1,000 Square Feet and one story
Section 406.1.2 Area Increase

- Up to 3,000 square feet storage of private or pleasure motor vehicles
- Separated in mixed use
- Fire separation distance of 5 feet
- Fire walls where more than one 3,000 square foot area in the building
Section 406.1.3 Garages and Carports

• Carport open on at least two sides
Section 406.1.4 Separation

- Private garage to the dwelling unit...
- 1/2 inch gypsum wall
- 5/8 inch gypsum ceiling
- Solid wood or steel or honeycomb steel
  1 3/8 inch doors, self-closing and self latching
Section 406.2 Parking Garages

- Commercial
Section 406.2.1 Classification

• Open Parking Garage – 406.3
• Enclosed Parking Garage – 406.4
• Special Provisions - 509
Section 406.2.2 Clear Height

• 7 foot clear height in all vehicle and pedestrian areas.

• Accessible van stalls in accordance with section 1106.5 / ICC A117.1
Section 406.2.3 Guards

• At exterior and interior openings in accordance with section 1012
Section 406.2.4 Vehicle Barriers

• Ends of drive and parking lanes where difference is greater than 1 foot.

• Design in accordance with section 1607.7.
Section 406.2.5 Ramps

• Vehicle ramps shall not be considered as required exits.

• Maximum slope 1 : 15
Section 406.2.6 Floor Surface

- Concrete or similar noncombustible and nonabsorbent material.
Section 406.2.7 Mixed
Separation

• Separated in accordance with section 508.3
Section 406.2.8 Special Hazards

• Provide separation from fuel fired appliances / vestibule
Section 406.2.9 Attached to Rooms

- Openings from parking garage directly into a room used for sleeping is prohibited.
Section 406.3 Open Parking Garages
Section 406.3.2 Definitions

• Open Parking Garage…s. 406.3.3.1
  Uniformly distributed openings on two
  or more sides, 20% of the total
  perimeter wall.
Section 406.3.3 Construction

• Type I, II or IV
Section 406.3.4 Uses

• Mixed use permitted...separated, non-separated, covered mall, special occupancy.
Section 406.3.5 Area and Height

- Chapter 5 as S2 or Table 406.3.5
Section 406.3.6 Area and Height Increases

- Three-fourths perimeter open, 25% and one tier
- Entire perimeter open, 50% and one tier
Section 406.3.7 Fire Separation Distance

- Table 601 and 602
- Openings per Table 602 and section 704
Section 406.3.8 Means of Egress

• Chapter 10!

• No persons other than attendance 36 inch minimum.
Section 406.3.9 Standpipes

- Chapter 9!
Section 406.3.10 Sprinkler Systems

• Chapter 9!
Section 406.3.11 Enclosure of Vertical Openings

• Section 406.3.8
Section 406.3.12 Ventilation

- Section 406.3.3.1
Section 406.3.13 Prohibitions

- Vehicle repair work
- Parking of buses, trucks or similar vehicles
- Partial or complete closing of required openings
- Dispensing of fuel
Section 406.4 Enclosed Parking Garages
Section 406.4.1 Height and Areas

- Table 503
- Modified by sections 504, 506 and 507
Section 406.4.2 Ventilation

- IMC (Int’l Mechanical Code)
Section 406.5 Motor fuel-dispensing facilities

• Canopies
Section 406.6 Repair Garages

• Mixed uses section 508.3
• Ventilation IMC
• Floor Surface
• Heating Equipment IMC
• Gas Detection
Section 407 Group I2

- Hospitals and Nursing Homes
Section 407.2 Corridors

• Continuous to exits and separated from other areas.
Section 407.2.1 Spaces of Unlimited Area

- Not occupied by patient rooms
- Fire detection
- Same smoke compartment, 907 and Quick Response per 903.3.2
- Not to obstruct access to exits
Section 407.2.2 Nurses’ Stations

- Permitted to be open to corridor
Section 407.2.3 Mental Health Treatment Areas

- Not to exceed 1,500 square feet
- Supervision by faculty staff
- Not to obstruct access to exits
- Detection per 907.2
- One per smoke compartment
- Walls and ceiling constructed as corridor
Section 407.2.4 Gift Shops

- Less than 500 square feet
- Fully sprinklered
- Storage areas protected per 508.2
Section 407.3 Corridor Walls

• Partitions…section 710
Section 407.4 Smoke Barriers

- Smoke Compartment area not more than 22,500 square feet
- Maximum 200 foot travel distance
- Build in accordance with 709
Section 407.5 Automatic Sprinkler System

- Section 903.3.1.1
- Smoke Compartments include Quick Response 903.3.2
Section 407.6 Automatic Fire Detection

- Corridors in nursing homes, detoxification facilities and spaces open to corridors by 407.2 – Automatic Fire Detection

- Hospitals shall be equipped with smoke detection
Section 407.7 Secured Yard

- Grounds can be fenced in...
- 30 net square feet for bed and litter.
- 6 net square feet ambulatory
Section 408 Group I3

- Detention
Section 408.2 Mixed Occupancies

• Classified as different occupancy

• Security shall provide for release of occupants at all times
Section 408.3 Means of Egress

• Chapter 10!
Section 408.4 Locks

• Permitted to be locked in accordance with the applicable use condition.
Section 408.5 Vertical Openings

• Section 707
Section 408.6 Smoke Barrier

• More than 50 occupants – two smoke compartment minimum

• Maximum number of residents per compartment – 200

• 6 square feet per occupant
Section 408.7 Subdivision of Resident Housing

- Sleeping area and group activity space based on occupancy condition
Section 408.8 Windowless Buildings

- Buildings with non-openable windows
- Smoke control system per 909
Section 409 Motion Picture Projection Rooms

- Ribbon type cellulose acetate utilized in conjunction with electric arc, xenon...
Section 409.2 Construction of Projection Rooms

• Construction consistent with the type of building.
Section 410 Stages and Platforms
Section 410.2 Definitions

- Fly Gallery
- Platform
- Proscenium Wall
- Stage
Section 410.3 Stages
Section 410.3.1 Stage Construction

• Floor construction consistent with the type of building.
Section 410.3.2 Galleries, Gridirons, Catwalks

- Not considered to be floors, stories, mezzanines or levels.
Section 410.3.3 Exterior Stage Doors

- Vestibule to prevent air drafts into the auditorium
Section 410.3.4 Proscenium Wall

• Where the stage height is greater than 50 feet, 2-hour
Section 410.3.5 Proscenium Curtain

- Where proscenium wall is rated...
- Fire curtain or water curtain (903.3.1.1)
Section 410.3.6 Scenery

- NFPA 701
- Section 805
- IFC
- Section 2603
Section 410.3.7 Stage Ventilation

• Stages larger than 1,000 square feet
• Stage height greater than 50 feet
Section 410.4 Platform Construction

- Construction type I, II or IV
- Not more than 30 inches above the main floor
- And not more than 1/3 of the room and not more than 3,000 square feet
Section 410.5 Dressing and Appurtenant Rooms

- Separated from the stage where stage height greater than 50 feet
- 2-hour fire barrier
- From each other by 1-hour fire barriers
Section 410.6 Automatic Sprinkler System

• Chapter 9!
Section 410.7 Standpipes

• Section 905
Section 411 Special Amusement Buildings

- Not a temporary use...
Section 412 Aircraft-Related Occupancies
Section 412.1 Airport Traffic Control Towers

- Table 412.1.2 Height and Area based on construction type
Section 412.2 Aircraft Hangars
Section 412.2.1 Exterior Walls

• Located less than 30 feet from property lines and lot lines
Section 412.2.2 Basements

- Floor must meet IA
- No openings or communication to hangar
- Access from outside only
Section 412.2.3 Floor Surface

• Graded and drained
Section 412.2.4 Heating Equipment

- Rooms separated by 2-hour construction
- Unit heaters 10 feet above upper surface of wings or engine enclosure
Section 412.2.5 Finishing

- Doping or painting...separate building
Section 412.2.6 Fire Suppression

- Aircraft hangars shall be provided with fire suppression as required by NFPA 409.
Section 412.3 Residential Aircraft Hangars

- Accessory building less than 2,000 square feet and 20 feet in height, constructed on a one or two family residential property.
Section 412.4 Aircraft Paint

Hangars

- Probably an “H2”…
Section 412.5 Heliports and Helistops

• On top of buildings in accordance with size, design and egress.
Section 413 Combustible Storage

- IFC
Section 414 Hazardous Materials

- Reference back to section 307…
Section 414.1.1 Other Provisions

• Reference 415 and IFC
Section 414.1.2 Materials

- Section 307, 415, IMC and IFC
Section 414.1.3 Information Required

• Separate plan identifying location and anticipated contents and processes.
• Prepared by qualified person, firm or corporation
• Approved by the building official
• Without charge to the enforcing agency
Section 414.2 Control Areas
Section 414.2.1 Construction Requirements

- Fire Barriers per section 706, horizontal per section 711
Section 414.2.2 Percentage of max. allowable quantities

• Table 414.2.2
**Section 414.2.3 Number**

- **Table 414.2.2**

<table>
<thead>
<tr>
<th>FLOOR LEVEL</th>
<th>PERCENTAGE OF THE MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA&lt;sub&gt;a&lt;/sub&gt;</th>
<th>NUMBER OF CONTROL AREAS PER FLOOR&lt;sub&gt;b&lt;/sub&gt;</th>
<th>FIRE RESISTANCE RATING FOR FIRE BARRIERS IN HOURS&lt;sub&gt;c&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above grade</td>
<td>Higher than 9 7-9 6 5 4 3 2 1</td>
<td>5 5 12.5 12.5 50 75 100</td>
<td>1 2 2 2 2 3 4</td>
</tr>
<tr>
<td>Below grade</td>
<td>1 2 Lower than 2</td>
<td>75 50 Not Allowed</td>
<td>3 2 1 1 1</td>
</tr>
</tbody>
</table>

<sub>a</sub> Maximum allowable quantity per control area.

<sub>b</sub> Number of control areas per floor.

<sub>c</sub> Fire resistance rating for fire barriers in hours.
Section 414.2.4 Fire-resistance-rating

- Table 414.2.2
Section 414.3 Ventilation

• IFC and IMC
Section 414.4 Hazardous Material Systems

• Systems involving hazardous materials shall be suitable for the intended application.
Section 414.5 Inside Storage Dispensing and Use

• Explosion control
• Monitor control equipment
• Automatic fire detection
• Standby Emergency Power
• Spill control
Section 414.6 Outdoor Storage Dispensing and Use

- Weather protection
- Walls
- Separation Distance
- Non-combustible construction
Section 414.7 Emergency Alarms

- Emergency alarm systems shall be supervised by an approved central, proprietary or remote service...initiate audible and visual signal at a constantly attended on-site location.
Section 415 Groups H1, H2, H3, H4 and H5

- Quantities in excess of section 307

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>CLASS</th>
<th>GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED</th>
<th>STORAGE^b</th>
<th>USE-CLOSED SYSTEMS^b</th>
<th>USE-OPEN SYSTEMS^b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combustible liquid</td>
<td>II IIIA IIIB</td>
<td>H-2 or H-3</td>
<td>N/A</td>
<td>120^a, 330^a, 13,200^c,f</td>
<td>N/A</td>
</tr>
<tr>
<td>Combustible fiber</td>
<td>Loose Baled</td>
<td>H-3</td>
<td>(100)</td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td>Consumer fireworks</td>
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</tr>
</tbody>
</table>
Section 415.2 Definitions

• Continuation from 307.2
Section 415.3 Fire Separation Distance

• Table 415.3.1 addresses quantity
Section 415.3.1 Group H Min.
Fire Separation Distance

• 1. H1 Not Less than 75 feet.
• 2. H2 Not Less than 30 feet / area exceeds 1,000 square feet
• 3. H2 and H3 Not Less than 50 feet where detached bldg required
• 4. IFC Where not specified / ref Table 415.3.1
Section 415.4 Special Provisions for H1

• No other use
• One story
• No basement
• Roofs are light weight
• Suitable thermal insulation to prevent sensitive material from decomposing
Section 415.5 Special Provisions for H2 and H3

• No other use
• One story
• No basement
Section 415.6 Group H2
Section 415.6.1 Comb. Dusts, Grain Process & Storage

• NFPA
• Type I or II construction
• Grinding rooms / 2-hour up to 3,000 square feet, then 4-hour fire barriers
• Conveyors, chapter 30
• Explosion control IFC
Section 415.6.2 Flammable and Combustible Liquids

- Mixed occupancies, Section 508.3.3
- Storage tanks not subject to height restriction of 503
- Tanks noncombustible and protected from physical damage
- IFC
- Suppression per 903
- Leak containment
Section 415.6.3 LP Gas-Distribution Facilities

• Air Movement
• Construction
• Separate or Attached buildings
• Fire separation distance and fire barriers
Section 415.6.4 Dry Cleaning Plants

• Classification in accordance with the IFC
Section 415.7 Groups H3 and H4

• IFC

• Floors shall be liquid tight and noncombustible

• Highly toxic solids and liquids not stored – separated from other hazards by 1-hour fire barriers
Section 415.8 Group H5

• Semiconductor fabrication facilities and similar research and development facilities
Section 416 Application of Flammable Finishes

• Spraying of flammable paints, varnishes and lacquers or other flammable materials or mixtures ... IFC
Section 417 Drying Rooms

• Drying rooms or Kilns installed within a building...
Section 418 Organic Coatings

• No pits or basements
Section 419 Group I1, R1, R2 and R3

- Walls separating dwelling units in the same building and walls separating sleeping units in the same building shall comply with section 708.

- Floor ceiling separation shall comply with section 711
Section 420 Hydrogen Cutoff Rooms

• Where required by the IFC