2018 IBC Fire Resistive Construction

Presented by
Colorado Code Consulting, LLC
INSTRUCTOR
Steve Thomas

- 35 years experience in code administration
- ICBO Committees
  - Small Jurisdictions
  - Fire & Life Safety Code Development
  - Means of Egress Review
- ICC Means of Egress Code Development Committee
- Author – Building Code Basics and Building Code Essentials

CLASS SUMMARY
- Review of Chapter 7 of the 2018 IBC
- Different Types of Fire-Resistance Rated Assemblies
- Opening Protected Openings
- Effective use of the code

WHY FIRE-RESISTIVE RATED CONSTRUCTION?

- Chicago Fire
  - October 8, 1871
  - 250 Deaths
- Cocoanut Grove Nightclub
  - November 28, 1942
  - 491 Deaths
Why Fire-Resistive Rated Construction?

- Beverly Hills Supper Club
  - May 28, 1977
  - 164 Deaths

- MGM Fire
  - November 21, 1980
  - 84 deaths and 679 injured

Fire and Smoke Protection Features

701.1 - Scope

- The provisions of this chapter shall govern the materials, systems and assemblies used for structural fire resistance and fire-resistance-rated construction separation of adjacent spaces to safeguard against the spread of fire and smoke within a building and the spread of fire to or from buildings.

702.1 Multiple Use Fire Assemblies

- Fire assemblies that serve multiple purposes in a building shall comply with all of the requirements that are applicable for each of the individual fire assemblies.

Fire-Resistant Ratings & Fire Tests - 703

- The fire-resistance rating of building elements, components or assemblies shall be determined in accordance with the test procedures set forth in ASTM E119 or UL 263 or in accordance with Section 703.3.
ASTM E119

- “fire-resistive properties of materials and assemblies be measured and specified to a common standard”
- “prescribe a standard exposing fire of controlled extent and severity”

703.2.4 Supplemental features

- Where materials, systems or devices that have not been tested as part of a fire-resistance-rated assembly are incorporated into the building element, component or assembly, sufficient data shall be made available to the building official to show that the required fire-resistance rating is not reduced.

703.3 Methods for determining fire resistance

- The application of any of the methods listed in this section shall be based on the fire exposure and acceptance criteria specified in ASTM E119 or UL 263.
- The required fire resistance of a building element, component or assembly shall be permitted to be established by any of the following methods or procedures:
703.3 Methods for determining fire resistance

1. Fire-resistance designs documented in approved sources.
2. Prescriptive designs of fire-resistance-rated building elements, components or assemblies as prescribed in Section 721.
3. Calculations in accordance with Section 722.
4. Engineering analysis based on a comparison of building element, component or assemblies having fire-resistance ratings as determined by the test procedures set forth in ASTM E119 or UL 263.
5. Alternative protection methods as allowed by Section 104.11.
6. Fire-resistance designs certified by an approved agency.

Gypsum Association

- 6525 Belcrest Rd #480
- Huntsville, MD 20782
- Phone: 301-277-8686
- Fax: 303-277-8747
- www.gypsum.org
Tables 721.1 Footnotes

- Generic fire-resistance ratings (those not designated as PROPRIETARY* in the listing) in the GA 600 shall be accepted as if herein listed.

GA Proprietary Systems

- Where the word "proprietary" appears in system descriptions either the system or one or more of its components is considered proprietary.
- Each proprietary system shall be built utilizing the components specified by the company or companies listed under the detailed description for that system.
- All other systems are generic.
- Generic systems are applicable to the products of any manufacturer, whether a member of the gypsum association or not, provided the products meet the appropriate standards.

GA Explanatory Notes

- 22 Notes!
- 2. Nails shall comply with ASTM F 547 or ASTM C 514. Other nails, suitable for the intended use, and having dimensions not less than those specified in this Manual shall be permitted as substitutions.

GA Explanatory Notes

- 4. Screws meeting ASTM C 1002 shall be permitted to be substituted for the prescribed nails, one for one, when the length and head diameter of the screws equal or exceed those of the nails specified in the tested system and the screw spacing does not exceed the spacing specified for the nails in the tested system.
GA Explanatory Notes

6. Unless otherwise specified, the face layers of all systems, except those with predecorated or metal covered surfaces, shall have joints taped (minimum Level 1 as specified in GA-214, Recommended Levels of Gypsum Board Finish) and fastener heads treated. Base layers in multi-layer systems shall not be required to have joints taped.

GA Explanatory Notes

9. Water-resistant gypsum backing board shall be installed over or as part of the fire-resistance rated system in shower and tub areas to receive ceramic or plastic wall tile or plastic finished wall panels. When fire or sound ratings are necessary, the gypsum board required for the rating shall extend down to the floor behind fixtures so that the construction will equal that of the tested system.

GA Explanatory Notes

10. When not specified as a component of a fire tested wall or partition system, mineral fiber, glass fiber, or cellulose fiber insulation of a thickness not exceeding that of the stud depth shall be permitted to be added within the stud cavity.

GA Explanatory Notes

11. In floor-ceiling or roof-ceiling systems, the addition or deletion of mineral or glass fiber insulation in ceiling joist spaces could possibly reduce the fire-resistance rating. The addition of up to 16 ¾ inches of 0.5 pcf glass fiber insulation (R-40), either batt or loose-fill, to any 1- or 2-hour fire resistance rated floor-ceiling or roof-ceiling system having a cavity deep enough to accept the insulation is permitted provided that one additional layer of either 1⁄2 inch type X or 5⁄8 inch type X gypsum board is applied to the ceiling. The additional layer of gypsum board shall be applied as described for the face layer of the tested system except that the fastener length shall be increased by not less than the thickness of the additional layer of gypsum board.
GA Explanatory Notes

• 15. Greater stud sizes (depths) shall be permitted to be used in metal- or wood-stud systems. Metal studs of heavier gage than those tested shall be permitted. The assigned rating of any load-bearing system shall also apply to the same system when used as a nonload-bearing system. Indicated stud spacings are maximums.

GA Explanatory Notes

• 16. Specified floor-ceiling and roof-ceiling framing sizes or truss dimensions are minimums. Greater joist or truss sizes (depths) shall be permitted to be used in metal- or wood-framed systems. Indicated joist and truss spacings are maximums.

GA Explanatory Notes

• 17. Within design limitations, the distance between parallel rows of studs, such as in a chase wall, shall be permitted to be increased beyond that tested.

• 21. Additional layers of type X or regular gypsum board shall be permitted to be added to any system.

GA Explanatory Notes

• 21. Additional layers of type X or regular gypsum board shall be permitted to be added to any system.

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GA Explanatory Notes

22. When not specified as a component of a fire-resistance rated wall or partition system, wood structural panels shall be permitted to be added to one or both sides. Such panels shall be permitted to be applied either as a base layer directly to the framing (under the gypsum board), as a face layer (over the face layer of gypsum board), or between layers of gypsum board in multi-layer systems. When such panels are applied under the gypsum board or between layers of gypsum board the length of the fasteners specified for the attachment of the gypsum board applied over the wood structural panels shall be increased by not less than the thickness of the wood structural panels. Fastener spacing for the gypsum board and the number of layers of gypsum board shall be as specified in the system description.
**I-Joist Floor System**

<table>
<thead>
<tr>
<th>GA FILE NO.</th>
<th>PC 5407</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENERIC</td>
<td></td>
</tr>
</tbody>
</table>

- **Wood I-Joists, Gypsum Wallboard**
- Base layer 4" type X gypsum wallboard applied at right angles to wood I-joists 24" o.c. with 1/2" Type W or G drywall screws 24" o.c. Face layer 4" type X gypsum wallboard or gypsum veneer base applied at right angles to I-joists with 1/2" Type W or G drywall screws 12" o.c. at joints and intermediate joints and 1/2" Type G drywall screws 12" o.c. placed 2" back on either side of end joints. Joints offset 24" from base layer joints. Wood I-joists supporting 4" wood I-joist purlin panels applied at right angles to joints with 8d nails.

**Truss Roof-Ceiling**

<table>
<thead>
<tr>
<th>GA FILE NO.</th>
<th>RC 2803</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROPRIETARY*</td>
<td></td>
</tr>
</tbody>
</table>

- **Wood Roof Truss, Resilient Channels, Glass or Mineral Fiber Insulation, Ceiling Dampers, Gypsum Wallboard**
- One layer of proprietary type X gypsum wallboard or gypsum veneer base applied at right angles to resilient bar channels 12" o.c. with 1/2" Type W or G drywall screws 8" o.c. Gypsum board and joints attached with screws 8" o.c. to additional layers of channel or log longitudinal 2" back on either side of end panels. Resilient channels applied at right angles to resilient bar channels and resilient bar channels applied at right angles to resilient bar channels or above and below resilient bar channels and resilient bar channels applied at right angles to resilient bar channels.

**Underwriters Laboratories**

- **UL is a testing agency**
- **The directory is not a code. It is a guide reporting tests**
- **www.ul.com**

**UL Design Information**

- **Fire resistance ratings apply only to assemblies in their entirety.**
- **Except for those separately rated structural members supporting tested assemblies, individual components are not assigned a fire resistance rating and are not intended to be interchanged between assemblies but rather are designated for use in a specific design in order that the ratings of the design may be achieved.**
UL Penetrations

- Penetrations through all or a portion of an assembly can significantly affect the rating.
- Firestop systems developed to protect openings created by penetration items are covered in Volume 2 of the Fire Resistance Directory.

UL Nails and Screws

- Nails are specified according to ASTM F547 or ASTM C514. Nails used to attach gypsum board to wood framing shall be cement coated box nails or cement coated cooler nails unless specified otherwise in the specific designs.
- Screws meeting ASTM C1002 or ASTM C954 may be substituted for nails, one for one, when the head diameter, length, and spacing equal or exceed the requirements for the specified nails.

Gypsum Board Joint Treatment (Fire Taping)

- Unless otherwise specified in the specific design all gypsum board systems except those with predecorated or metal covered surfaces have joints taped and fastener heads covered with one coat of joint compound (fire taped).
- Base layers in multi layer systems are not required to have joints or fastener heads taped or covered with joint compound.

Gypsum Board

- Gypsum board thicknesses specified in specific designs are minimums.
- Greater thicknesses of gypsum board are permitted as long as the fastener length is increased to provide penetration into framing that is equal to or greater than that achieved with the specified gypsum board thickness and fasteners.
- Additional layers of gypsum board are permitted to be added to any design.
1. **Floor and Ceiling Runners** Steel channels, 1 in. deep by 2-1/2 in. wide, fabricated from No. 25 MSG galv steel, attached to concrete or masonry with fasteners 24 in. on centers.

2. **Steel Studs** 2-1/2 in. wide with 1-3/8 in. legs, 1/4 in. flange in legs, fabricated from No. 25 ga galv steel, 1-1/2 in. wide by 1-3/4 in. high conduit cutouts spaced 24 in. OC. Studs 1/2 in. less in length than assembly height.

3. **Gypsum Board** 1/2 in. thick, paper or vinyl surfaced. Wallboard sheets applied vertically or horizontally with vertical joints located over studs attached to studs with 1 in. self-drilling, self-tapping steel screws located 12 in. OC in the field and 8 in. OC at joints. Joints covered with paper tape and joint compound. Exposed screw heads covered with joint compound.

4. **Batts and Blankets** 2 in. thick batts, supplied in 24 in. widths, placed to fill interior of wall. Any mineral wool batt bearing the UL Classification Marking as to Fire Resistance. See Batts and Blankets (BZJZ) Category For Names of Classified Companies.

5. **Fiber, Sprayed** As an alternate to Batts and Blankets (Item 4) — Spray applied cellulose insulation material. The fiber is applied with water to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. Nominal dry density of 3.0 lb/ft³.

### Prescriptive Fire Resistance 721

- The provisions of this section contain prescriptive details of fire-resistance-rated building elements, components or assemblies.
- The materials of construction listed in Table 721.1(1), Table 721.1(2), and Table 721.1(3) shall be assumed to have the fire-resistance ratings prescribed therein.
- Where materials that change the capacity for heat dissipation are incorporated into a fire-resistance-rated assembly, fire test results or other substantiating data shall be made available to show that the required fire-resistance rating time period is not reduced.
Table 721.1(1)

**Table 721.1(1)**

<table>
<thead>
<tr>
<th>STRUCTURAL PARTS TO BE PROTECTED</th>
<th>PROTECTING MATERIAL USED</th>
<th>MINIMUM THICKNESS OF WORKING MATERIAL</th>
<th>FIRE RESISTANCE PERIOD (OURS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1</td>
<td>Concrete, lightweight and sand-lighweight aggregate concrete, members 6&quot; or greater (not including saniters, grates and silo doors);** 1-2</td>
<td>1/2</td>
<td>2</td>
</tr>
<tr>
<td>1-2</td>
<td>Concrete, lightweight and sand-lighweight aggregate concrete, members 6&quot; or greater (not including saniters, grates and silo doors);** 1-3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>1-3</td>
<td>Concrete, lightweight and sand-lighweight aggregate concrete, members 12&quot; or greater (not including saniters, grates and silo doors);** 1-4</td>
<td>1/2</td>
<td>1</td>
</tr>
<tr>
<td>1-4</td>
<td>Silica aggregate concrete and concrete included in 1-1, members 6&quot; or greater;** 1-5</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>1-5</td>
<td>Silica aggregate concrete and concrete included in 1-1, members 12&quot; or greater;** 1-6</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

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Table 721.1(2)

12-1-1 0.035" (0.9 mm) steel sheet galvanized hot-rolled steel 24" on center with one 1/2" (13 mm) Type C gypsum wallboard applied vertically attached with 1" long No. 14 phosphated screws spaced 12" on center along top and bottom and 10" on center along intermediate studs.

12-1-2 0.035" (0.9 mm) steel sheet galvanized hot-rolled steel 24" on center with one 1/2" (13 mm) Type C gypsum wallboard applied vertically attached with 1" long No. 14 phosphated screws spaced 12" on center along top and bottom and 10" on center along intermediate studs.

12-1-3 0.035" (0.9 mm) steel sheet galvanized hot-rolled steel 24" on center with one 1/2" (13 mm) Type C gypsum wallboard applied vertically attached with 1" long No. 14 phosphated screws spaced 12" on center along top and bottom and 10" on center along intermediate studs.

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Table 721.1(3)

25. Wind load minimum gust speed of 105 mph, with a maximum 1" (25 mm) diameter pipe of 24" (600 mm) in length with a minimum 1" (25 mm) diameter pipe of 24" (600 mm) in length with one 1/2" (13 mm) Type C gypsum wallboard applied perpendicular to the sheath and attached to the outside face of the structural wall at 12" (300 mm) intervals using 1" long No. 14 phosphated screws spaced 12" (300 mm) on center along top and bottom and 10" (250 mm) on center along intermediate studs.

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722 Calculated Fire Resistance

- The provisions of this section contain procedures by which the fire resistance of specific materials or combinations of materials is established by calculations.
- These procedures apply only to the information contained in this section and shall not be otherwise used.

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Calculated Fire Resistance

- The calculated fire resistance of concrete, concrete masonry and clay masonry assemblies shall be permitted in accordance with ACI 216.1/TMS 0216.
- The calculated fire resistance of steel assemblies shall be permitted in accordance with Chapter 5 of ASCE 29.
- The calculated fire resistance of exposed wood members and wood decking shall be permitted in accordance with Chapter 16 of ANSI/AWC National Design Specification for Wood Construction (NDS).

703.7 – ID of Fire and Smoke Separation Walls

- "Fire and/or Smoke Barrier – Protect All Openings"
- Within 15’ from end walls, 30’ maximum spacing
- 3” high with 3/8” stroke
- Within accessible above ceiling spaces

Table 601

<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>Primary structural frame</td>
<td>A</td>
<td>B</td>
<td>A²</td>
<td>B²</td>
<td>HT</td>
</tr>
<tr>
<td>Bearing walls</td>
<td>3²</td>
<td>2²</td>
<td>1²</td>
<td>0²</td>
<td>1</td>
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<tr>
<td>Nonbearing walls and partitions</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonbearing walls and partitions</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Fire resistance of smoke barriers</td>
<td>See Table 602</td>
<td>See Table 602</td>
<td>See Table 602</td>
<td>See Table 602</td>
<td>See Table 602</td>
</tr>
<tr>
<td>Roof construction and assemblies</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Roof construction and assemblies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Building Element 202

- A fundamental component of building construction, listed in Table 601, which may or may not be of fire-resistance-rated construction and is constructed of materials based on the building type of construction.

Primary Frame Definition 202

- The primary structural frame shall include all of the following structural members:
  1. The columns;
  2. Structural members having direct connections to the columns, including girders, beams, trusses and spandrels;
  3. Members of the floor construction and roof construction having direct connections to the columns; and
  4. Bracing members that are essential to the vertical stability of the primary structural frame under gravity loading shall be considered part of the primary structural frame whether or not the bracing member carries gravity loads.

Secondary Frame Definition 202

- The following structural members shall be considered secondary members and not part of the primary structural frame:
  1. Structural members not having direct connections to the columns;
  2. Members of the floor construction not having direct connections to the columns; and
  3. Bracing members other than those that are part of the primary structural frame.

Column protection 704.2

- Where columns are required to be fire-resistance rated, the entire column shall be provided individual encasement protection by protecting it on all sides for the full column length, including connections to other structural members, with materials having the required fire-resistance rating.
- Where the column extends through a ceiling, the encasement protection shall be continuous from the top of the foundation or floor/ceiling assembly below through the ceiling space to the top of the column.

Except as permitted in Section 704.4.1
Protection of the Primary Structural Frame Other Than Columns - 704.3

- Members of the primary structural frame other than columns that are required to have a fire-resistance rating and support more than two floors or one floor and roof, or support a load-bearing wall or a non-load-bearing wall more than two stories high, shall be provided individual encasement protection by protecting them on all sides for their full length, including connections to other structural members, with materials having the required fire-resistance rating.

Section 704.3

- Exception:
  - Individual encasement protection on all sides shall be permitted on all exposed sides provided the extent of protection is in accordance with the required fire-resistance rating, as determined in Section 703.

Protection of Secondary Members 704.4

- Secondary members that are required to have protection to achieve a fire-resistance rating shall be protected by individual encasement protection.

Light-Frame Construction 704.4.1

- Studs, columns and boundary elements that are integral elements in walls of light-frame construction and are located entirely between the top and bottom plates or tracks shall be permitted to have required fire-resistance ratings provided by the membrane protection provided for the wall.
Exterior Structural Members 704.10

- Load-bearing structural members located within the exterior walls or on the outside of a building or structure shall be provided with the highest fire-resistance rating as determined in accordance with the following:
  1. Table 601 for the type of building element based on the type of construction of the building;
  2. Table 601 for exterior bearing walls based on the type of construction; and
  3. Table 602 for exterior walls based on the fire separation distance.

Spray-applied Fire Resistive Materials – 704.13.1

- The application of SFRM shall be consistent with the fire-resistance rating and the listing, including, but not limited to, minimum thickness and dry density of the applied SFRM, method of application, substrate surface conditions and the use of bonding adhesives, sealants, reinforcing or other materials.

Surface Conditions 704.13.3.1

- Substrates to receive SFRM shall be free of dirt, oil, grease, release agents, loose scale and any other condition that prevents adhesion.
- The substrates shall also be free of primers, paints and encapsulants other than those fire tested and listed by a nationally recognized testing agency.
- Primed, painted or encapsulated steel shall be allowed, provided that testing has demonstrated that required adhesion is maintained.

Temperature 704.13.4

- A minimum ambient and substrate temperature of 40°F shall be maintained during and for a minimum of 24 hours after the application of the SFRM, unless the manufacturer's installation instructions allow otherwise.
Finished Condition 704.13.5

- The finished condition of SFRM applied to structural members or assemblies shall not, upon complete drying or curing, exhibit cracks, voids, spalls, delamination or any exposure of the substrate.
- Surface irregularities of SFRM shall be deemed acceptable.

UL Listings

1. Steel Beam — W8x28 min size.
2. Normal Weight or Lightweight Concrete — Compressive strength, 3000 psi.
3. Shear Connector — (Optional) — Studs, 3/4 in. diam headed type or equivalent per AISC specifications. Welded to the top flange of beam through the steel floor units.
4. Welded Wire Fabric — (Optional) — 6x6-10/10 SWG.
5. Steel Floor and Form Units* — 1-5/16 in. deep corrugated units; or 1-1/2 to 3 in. deep fluted or cellular units, welded to beam.

Sprayed Fire-resistant Materials

- Spray-Applied Fire Resistant Materials* — Applied by mixing with water and spraying in more than one coat to the beam to the final thicknesses shown below.
- When fluted or corrugated steel floor units are used, crest areas shall be filled with Spray-Applied Fire Resistant Materials above the beam.
- Beam surfaces must be clean and free of dirt, loose scale and oil. Min avg and min ind density of 15/14 pcf respectively.

<table>
<thead>
<tr>
<th>Rating Hr</th>
<th>Restrained Beam Rating Hr</th>
<th>Unrestrained Beam Rating Hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/2</td>
<td>1/2</td>
</tr>
<tr>
<td>1 1/2</td>
<td>11/16</td>
<td>13/16</td>
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<td>2</td>
<td>15/16</td>
<td>1-1/6</td>
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<td>3</td>
<td>1-7/16</td>
<td>1-9/16</td>
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<tr>
<td>4</td>
<td>1-15/16</td>
<td>2</td>
</tr>
</tbody>
</table>

Sprayed Fire-resistant Materials - 1705.13

- Special inspections for sprayed fire-resistant materials applied to structural elements and decks shall be in accordance with Sections 1704.12.1 through 1704.12.6.
- Special inspections shall be based on the fire-resistance design as designated in the approved construction documents.
Physical and Visual Tests
1705.14.1

- The special inspections shall include the following tests and observations to demonstrate compliance with the listing and the fire-resistance rating:
  1. Condition of substrates.
  2. Thickness of application.
  3. Density in pounds per cubic foot.
  5. Condition of finished application.

Thickness
1704.14.4

- No more than 10 percent of the thickness measurements of the sprayed fire-resistant materials applied to floor, roof and wall assemblies and structural members shall be less than the thickness required by the approved fire-resistance design, but in no case less than the minimum allowable thickness required by Section 1704.12.4.1.

Exterior Walls
705

- Exterior walls shall comply with this section

Exterior Walls - Projections
705.2

- Cornices, eave overhangs, exterior balconies and similar architectural appendages extending beyond the floor area shall conform to the requirements of this section and Section 1406
- Exterior egress balconies and exterior exit stairways shall also comply with Sections 1019 and 1026
Projections 705.2

- Projections shall not extend any closer to the line used to determine the fire separation distance than shown in Table 705.2.
  - Exception: Buildings on the same lot and considered as portions of one building in accordance with Section 705.3 are not required to comply with this section.

Projections 705.2.1 & 705.2.2

- Type I & II
  - noncombustible materials or combustible per 1406.3 and 1406.4.
- Type III, IV, V
  - Any approved materials

Combustible Projections 705.2.3

- Combustible projections extending to within 5 feet of the line used to determine the fire separation distance shall be of not less than 1-hour fire-resistance-rated construction, heavy timber construction, complying with Section 2304.11, fire-retardant-treated wood or as permitted by Section 705.2.3.1.
  - Exception: Type VB construction shall be allowed for combustible projections in Group R-3 and U occupancies with a fire separation distance greater than or equal to 5 feet

Buildings on Same Lot 705.3

- For the purposes of determining the required wall and opening protection, projections and roof-covering requirements, buildings on the same lot shall be assumed to have an imaginary line between them.
- Exceptions
  - Two or more buildings on the same lot shall either be regulated as separate buildings or shall be considered as portions of one building if the aggregate area of such buildings is within the limits specified in Chapter 5 for a single building.
Buildings on Same Property & Courts - 705.3

- Where a new building is to be erected on the same property as an existing building, the location of the assumed property line with relation to the existing building shall be such that the exterior wall and opening protection of the existing building meet the criteria as set forth in Sections 705.5 and 705.8.

Exterior Wall Fire Ratings 705.5

- Exterior walls shall be fire-resistance rated in accordance with Tables 601 and 602.

<table>
<thead>
<tr>
<th>FIRE SEPARATION DISTANCE = X (ft)</th>
<th>TYPE OF CONSTRUCTION</th>
<th>OCCUPANCY GROUP II</th>
<th>OCCUPANCY GROUP V, X, S-1</th>
<th>OCCUPANCY GROUP B, C, E, F, E, S-1, U, B-1, B-2, B-3, B-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>X ≤ 5'</td>
<td>All</td>
<td>3</td>
<td>2</td>
<td>1</td>
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<tr>
<td>5 ≤ X &lt; 10</td>
<td>IA, IB</td>
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<tr>
<td></td>
<td>Others</td>
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<td>10 ≤ X &lt; 36</td>
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<td>X ≥ 30</td>
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</table>

Structural Stability 705.6

- The wall shall extend to the height required by Section 705.11 and shall have sufficient structural stability such that it will remain in place for the duration of time indicated by the required fire-resistance rating.
Allowable Area of Openings - 705.8.1

- The maximum area of unprotected and protected openings permitted in an exterior wall in any story of a building shall not exceed the percentages specified in Table 705.8.

- Exceptions:
  1. In other than Group H occupancies, unlimited unprotected openings are permitted in the first story above grade either:
     1.1. Where the wall faces a street and has a fire separation distance of more than 15 feet; or
     1.2. Where the wall faces an unoccupied space. The unoccupied space shall be on the same lot or dedicated for public use, shall not be less than 30 feet in width and shall have access from a street by a posted fire lane in accordance with the International Fire Code.
  2. Buildings whose exterior bearing walls, exterior non-bearing walls and exterior primary structural frame are not required to be fire-resistance rated shall be permitted to have unlimited unprotected openings.

Protected Openings 705.8.2

- Where openings are required to be protected, fire doors and fire shutters shall comply with Section 717.4 and fire window assemblies shall comply with Section 716.5.

### Table 705.8

<table>
<thead>
<tr>
<th>FIRE SEPARATION DISTANCE (ft)</th>
<th>UNPROTECTED</th>
<th>PROTECTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 25 ft</td>
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<td></td>
</tr>
<tr>
<td>Unsprayed, Noncombustible (E.P. I)</td>
<td>Not Required</td>
<td>Not Required</td>
</tr>
<tr>
<td>Unsprayed, Sprinklered (E.P. 50)</td>
<td>Not Required</td>
<td>Not Required</td>
</tr>
<tr>
<td>Protected (P)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 ft. to 30 ft</td>
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<td></td>
</tr>
<tr>
<td>Unsprayed, Noncombustible (E.P. I)</td>
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<td>Not Required</td>
</tr>
<tr>
<td>Unsprayed, Sprinklered (E.P. 50)</td>
<td>Not Required</td>
<td>Not Required</td>
</tr>
<tr>
<td>Protected (P)</td>
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<tr>
<td>30 ft. to 35 ft</td>
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<td>Unsprayed, Noncombustible (E.P. I)</td>
<td>Required</td>
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</tr>
<tr>
<td>Unsprayed, Sprinklered (E.P. 50)</td>
<td>Required</td>
<td>Not Required</td>
</tr>
<tr>
<td>Protected (P)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35 ft. to 40 ft</td>
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<td></td>
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<tr>
<td>Unsprayed, Noncombustible (E.P. I)</td>
<td>Required</td>
<td>Not Required</td>
</tr>
<tr>
<td>Unsprayed, Sprinklered (E.P. 50)</td>
<td>Required</td>
<td>Not Required</td>
</tr>
<tr>
<td>Protected (P)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Exterior Wall/Opening Exercise

Determine:
- Exterior Wall Ratings
- Protected/Unprotected Openings
- Percentage of Openings

Group B, Type VB
Sprinklered

2 ft. 25 ft.
5 ft. 15 ft.
60’ Street

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Vertical Separation of Openings
705.8.5
- Openings in adjacent stories shall be separated vertically where openings are within 5 feet horizontally and lower opening not protected
  - 3 ft., one-hour fire rated or 30” flame barrier

Vertical Separation of Openings
705.8.5 - Exceptions
1. This section shall not apply to buildings that are three stories or less above grade plane.
2. This section shall not apply to buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.
3. Open parking garages.

Vertical Exposure
705.8.6
- Buildings on the same lot
  - 3/4 hr. opening protective shall be provided in every opening that is less than 15 feet vertically above the roof of an adjacent building or structure based on assuming an imaginary line between them.
  - The opening protective are required where the fire separation distances from the imaginary line to each building or structure are less than 15 feet.

Vertical Exposure
705.8.6 Exceptions
1. Opening protective are not required where the roof assembly of the adjacent building or structure has a fire-resistance rating of not less than 1 hour for a minimum distance of 10 feet from the exterior wall facing the imaginary line and the entire length and span of the supporting elements for the fire-resistance-rated roof assembly has a fire-resistance rating of not less than 1 hour.
2. Buildings on the same lot and considered as portions of one building in accordance with Section 705.3 are not required to comply with Section 705.8.6.
Joints 705.9

- Joints made in or between exterior walls required by this section to have a fire-resistance rating shall comply with Section 715.
  EXCEPTION: Joints in exterior walls that are permitted to have unprotected openings.

Ducts And Air Transfer Openings - 705.10

- Penetrations by air ducts and air transfer openings in fire-resistance-rated exterior walls required to have protected openings shall comply with Section 717.
  – EXCEPTION: Foundation vents

Parapets at Exterior Walls 705.11

- Parapets shall be provided on exterior walls of buildings.

Parapet Exceptions

1. Walls not required to be fire-resistance rated in accordance with Table 602
2. Not more than 1,000 square feet on any floor.
Parapet Exceptions

3. Walls that terminate at roofs of not less than 2-hour fire-resistance-rated construction or where the roof, including the deck and supporting construction, is constructed entirely of noncombustible materials.

Parapet Exceptions

4. One-hour fire-resistance-rated exterior walls that terminate at the underside of the roof sheathing, deck or slab, provided:

4.1 Where the roof/ceiling framing elements are parallel to the walls, such framing and elements supporting such framing shall not be of less than 1-hour fire-resistance-rated construction for a width of 4 feet measured from the interior side of the wall for Groups R and U and 10 feet for other occupancies, measured from the interior side of the wall.

4.2 Where roof/ceiling framing elements are not parallel to the wall, the entire span of such framing and elements supporting such framing shall not be of less than 1-hour fire-resistance-rated construction.

4.3 Openings in the roof shall not be located within 5 feet of the 1-hour fire-resistance-rated exterior wall for Groups R and U and 10 feet for other occupancies, measured from the interior side of the wall.

4.4 The entire building shall be provided with not less than a Class B roof covering.
Parapet Exceptions

5. In Groups R-2 and R-3, where the entire building is provided with a Class C roof covering, the exterior wall shall be permitted to terminate at the roof sheathing or deck in Types III, IV and V construction provided:
   - The roof sheathing or deck is constructed of approved noncombustible materials or of fire-retardant-treated wood, for a distance of 4 feet; or
   - The roof is protected with 0.625-inch Type X gypsum board directly beneath the underside of the roof sheathing or deck, supported by a minimum of nominal 2-inch ledgers attached to the sides of the roof framing members, for a minimum distance of 4 feet.

Parapet Exceptions

6. Walls permitted to have at least 25% of the exterior wall areas containing unprotected openings in Section 705.8

Parapet Construction

705.11.1

- Same fire-resistance rating as supporting wall
- Noncombustible faces for the uppermost 18 inches
- 30 inches above the point where the roof surface and the wall intersect.
- If roof slopes toward a parapet at a slope greater than two units vertical in 12 units horizontal, the parapet shall extend to the same height as any portion of the roof within as fire separation distance where protection of wall openings is required, but in no case shall the height be less than 30 inches.

Fire Walls

503.1

- For the purposes of determining area limitations, height limitations and type of construction, each portion of a building separated by one or more fire walls complying with Section 706 shall be considered to be a separate building.
Structural Stability 706.2

- Fire walls shall be designed and constructed to allow collapse of the structure on either side without collapse of the wall under fire conditions.
- Fire walls designed and constructed in accordance with NFPA 221 shall be deemed to comply with this section.
- Exception for SDC D-F

Materials 706.3

- Noncombustible materials except Type V

Fire Resistance Rating Table 706.4

<table>
<thead>
<tr>
<th>GROUP</th>
<th>FIRE-RESISTANCE RATING (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A, B, E, H-4, I, R-1, R-2, U</td>
<td>3a</td>
</tr>
<tr>
<td>F-1, H-3a, H-5, M, S-1</td>
<td>3b</td>
</tr>
<tr>
<td>H-1, H-2</td>
<td>4b</td>
</tr>
<tr>
<td>F-2, S-2, R-3, R-4</td>
<td>2</td>
</tr>
</tbody>
</table>

- In Type II or V construction, walls shall be permitted to have a 2-hour fire-resistance rating.
- For Group H-1, H-2 or H-3 buildings, also see Sections 415.4 and 415.5.

Horizontal Continuity 706.5

- Fire walls shall be continuous from exterior wall to exterior wall and shall extend at least 18 inches beyond the exterior surface of exterior walls.
Horizontal Continuity 706.5, Exception 1

- Shall be permitted to terminate at the interior surface of combustible exterior sheathing or siding provided the exterior wall has a fire-resistance rating of at least 1 hour for a horizontal distance of at least 4 feet on both sides of the fire wall.
- Openings within such exterior walls shall be protected by fire assemblies having a fire-protection rating of not less than 3/4 hour.

Horizontal Continuity 706.5, Exception 2

- Shall be permitted to terminate at the interior surface of noncombustible exterior sheathing, exterior siding or other noncombustible exterior finishes provided the sheathing, siding, or other exterior noncombustible finish extends a horizontal distance of at least 4 feet on both sides of the fire wall.

Horizontal Continuity 706.5, Exception 3

- Fire walls shall be permitted to terminate at the interior surface of noncombustible exterior sheathing where the building on each side of the fire wall is protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

Exterior Walls 706.5.1

- Where the fire wall intersects exterior walls, the fire-resistance rating and opening protection of the exterior walls shall comply with one of the following:
Horizontal Continuity
706.5

1. The exterior walls on both sides of the fire wall shall have a 1-hour fire-resistance rating with 3/4-hour protection where opening protection is required by Section 705.8. The fire-resistance rating of the exterior wall shall extend a minimum of 4 feet on each side of the intersection of the fire wall to exterior wall.

- Exterior wall intersections at fire walls that form an angle equal to or greater than 180 degrees do not need exterior wall protection.

Horizontal Projecting Elements
706.5.2

- Fire walls shall extend to the outer edge of horizontal projecting elements such as balconies, roof overhangs, canopies, marquees and similar projections that are within 4 feet of the fire wall.

Horizontal Continuity
706.5.1

2. Buildings or spaces on both sides of the intersecting fire wall shall assume to have an imaginary lot line at the fire wall and extending beyond the exterior of the fire wall. The location of the assumed line in relation to the exterior walls and the fire wall shall be such that the exterior wall and opening protection meet the requirements set forth in Sections 705.5 and 705.8.

- Such protection is not required for exterior walls terminating at fire walls that form an angle equal to or greater than 180 degrees.

Horizontal Projecting Elements Exceptions

1. Horizontal projecting elements without concealed spaces provided the exterior wall behind and below the projecting element has not less than 1-hour fire-resistance-rated construction for a distance not less than the depth of the projecting element on both sides of the fire wall. Openings within such exterior walls shall be protected by fire assemblies having a fire protection rating of not less than 3/4 hour.
Horizontal Projecting Elements

Exceptions

2. Noncombustible horizontal projecting elements with concealed spaces, provided a minimum 1-hour fire-resistance-rated wall extends through the concealed space.
   - The projecting element shall be separated from the building by a minimum of 1-hour fire-resistance-rated construction for a distance on each side of the firewall equal to the depth of the projecting element.
   - The wall is not required to extend under the projecting element where the building exterior wall is not less than 1-hour fire-resistance rated for a distance on each side of the firewall equal to the depth of the projecting element.
   - Openings within such exterior walls shall be protected by fire assemblies having a fire protection rating of not less than 3/4 hour.

Vertical continuity

706.6

- Fire walls shall extend from the foundation to a termination point at least 30 inches above both adjacent roofs.

Vertical Continuity

706.6, Exception 2

- Fire walls shall extend from the foundation to a termination point at least 30 inches above both adjacent roofs.
Vertical Continuity 706.6, Exception 3

Noncombustible Roof Construction

No openings within 4 feet of fire wall

Class B Roofing

Vertical Continuity 706.6, Exception 4

- Type III, IV and V Construction
  - No openings within 4 feet of fire wall
  - Roof is covered with a minimum class B roof covering
  - Roof sheathing or deck is constructed of fire-retardant-treated wood for a distance of 4 feet on each side of the wall or walls, or
  - 5/8-inch Type X gypsum board is installed directly beneath the roof sheathing supported by 2-inch ledgers attached to sides of framing members for a distance of 4 feet on each side of the fire walls.

Vertical Continuity 706.6, Exception 5

- In buildings designed in accordance with Section 509.2, fire walls located above the 3-hour horizontal assembly required by Section 509.2, Item 1 shall be permitted to extend from the top of this horizontal assembly.

Vertical Continuity 706.6, Exception 6

- 6. Buildings with sloped roofs in accordance with Section 706.6.2
### Stepped Buildings 706.6.1

- Where a fire wall serves as an exterior wall for a building and separates buildings having different roof levels, such wall shall terminate at a point not less than 30 inches above the lower roof level, provided the exterior wall for a height of 15 feet above the lower roof is not less than 1-hour fire-resistance-rated construction from both sides with openings protected by assemblies having a 3/4-hour fire protection rating.

### Stepped Buildings 706.6.1, Exceptions

- Buildings with sloped roofs 706.6.2
  - Where a fire wall serves as an interior wall for a building, and the roof on one side or both sides of the fire wall slopes toward the fire wall at a slope greater than two units vertical in 12 units horizontal, the fire wall shall extend to a height equal to the height of the roof located 4 feet from the fire wall plus 30 inches. In no case shall the extension of the fire wall be less than 30 inches.

### Fire Wall Openings 706.8

- Section 715.4
- Each opening limited to 156 square feet (unless building is sprinklered).
- Aggregate width at any floor limited to 25% of length of wall
Ducts and Air Transfer Openings – 706.11

- Ducts and air transfer openings shall not penetrate fire walls.
  - Exception: walls not located on a lot line complying with 717
    Limited 25% of length of wall

Fire Barriers 707

- Shaft enclosures
- Interior exit stairways
- Exit access stairway enclosures
- Exit passageways
- Horizontal exits
- Atrium separations
- Incidental use areas
- Control areas
- Separation of mixed occupancies
- Fire areas

Fire Areas 707.3.10

- The fire barriers, fire walls or horizontal assemblies, or combination thereof, separating a single occupancy into different fire areas shall have a fire-resistance rating of not less than that indicated in Table 707.3.10.

Exterior Walls 707.4

- Where exterior walls serve as a part of a required fire-resistance-rated shaft or stairway or ramp enclosure, or separation, such walls shall comply with the requirements of Section 705 for exterior walls and the fire-resistance-rated enclosure or separation requirements shall not apply.

- Exceptions
  - Egress components
Fire Barrier Continuity 707.5

- Fire barriers shall extend from the top of the floor/ceiling assembly below to the underside of the floor sheathing, slab or deck above.
- Continuous through concealed spaces such as suspended ceilings.

Supporting construction 707.5.1

- The supporting construction for a fire barrier shall be protected to afford the required fire-resistance rating of the fire barrier supported.
- Hollow vertical spaces within a fire barrier shall be fireblocked in accordance with Section 718.2 at every floor level.

Exceptions:
1. The maximum required fire-resistance rating for assemblies supporting fire barriers separating tank storage as provided for in Section 415.9.1.2 shall be 2 hours, but not less than required by Table 601 for the building construction type.
2. Supporting construction for 1-hour fire barriers required by Table 509 in buildings of Type IIB, IIB and VB construction is not required to be fire-resistance rated unless required by other sections of this code.

Fire Barrier Openings 707.6

- Per Section 716.
- Limited to a maximum aggregate width of 25 percent of the length of the wall, and the maximum area of any single opening shall not exceed 156 square feet.
- Openings in enclosures for exit access stairways and ramps, interior exit stairways and ramps and exit passageways shall also comply with Sections 1019, 1023.4 and 1024.5, respectively.

Exceptions
- Not limited to 156 sq. ft. if sprinklered.
- Interior exit stairways fire doors not limited.
- If tested to ASTM E119 or UL 263.
- Fire windows in atria.
- Not limited in fire doors separating exit enclosures from exit passageways.

Fire Partitions 708

- Dwelling separations
- Sleeping unit separations
- Tenant separations in mall buildings
- Corridor walls
- Elevator lobby separations
- Egress Balconies
Fire Resistance Rating 708.3

- One Hour
  - Except: ½ hour corridor walls per Table 1020.1
  - Dwelling unit & guestroom separation Types IIB, IIIB and VB permitted to be ½ hour rated with NFPA 13 sprinkler system

Fire Partitions Continuity 708.4

- Fire partitions shall extend from the top of the foundation or floor/ceiling assembly below and be securely attached to one of the following:
  1. The underside of the floor or roof sheathing, deck or slab above.
  2. The underside of a floor/ceiling or roof/ceiling assembly having a fire-resistance rating that is not less than the fire-resistance rating of the fire partition.

Fire Partition Continuity Exceptions

- Need not extend into crawl space w/1 hr floor above crawl space
- Mall tenant space separations

Fire Partition Continuity Exceptions

- Fire-Resistant Rated Corridors
Fire Partitions Continuity 708.4.1

- Supporting construction shall be protected to afford the required fire-resistance rating of the wall supported,
- except for tenant and sleeping room separation walls and exit access corridor walls in buildings of Types IIB, IIIB, and VB construction.

Smoke Barriers 709

- 1-hour fire-resistance rated
- Continuous from outside wall to outside wall and slab to underside of floor/roof deck above for smoke compartments
- Supporting structure the same
- 20 minute opening protective (715)

Exceptions
- I-2 occupancies where doors are installed across the corridors
- I-2, horizontal sliding doors per Section 1008.1.4.3

Smoke Partitions 710

- Glass atrium separation
- I-2 corridor walls
- Elevator lobbies in sprinklered buildings

Smoke Partitions 710

- Not required to have fire-resistive rating
- Must extend from the floor to the underside of the floor or roof deck above or to the underside of the ceiling above where the ceiling membrane is constructed to limit the transfer of smoke
### Smoke Partition Openings 710.5

- **Windows**
  - Sealed to resist the free passage of smoke or automatic-closing upon detection of smoke

- **Louvers**
  - Doors in smoke partitions shall not include louvers

- **Smoke and draft-control doors**
  - Where required elsewhere
  - Tested in accordance with UL 1784.
  - Air leakage rate shall not exceed 3.0 cubic feet per minute per square foot of door opening at 0.10 inch

- **Self-closing or automatic-closing doors**
  - Where required elsewhere shall be self-closing or automatic-closing

### Penetrations and joints 710.6

- The space around penetrating items and in joints shall be filled with an approved material to limit the free passage of smoke.

### Ducts And Air Transfer Openings 710.7

- Space around ducts shall be filled with an approved material to limit the free passage of smoke.

- Air transfer openings in smoke partitions shall be provided with a smoke damper complying with Section 717.3.2.
  - Exception: Smoke control system

### Horizontal Assemblies 711.2.1

- Assemblies shall be of materials permitted by the building type of construction.
Continuity 711.2.2

- Assemblies shall be continuous without vertical openings, except as permitted by this section and Section 712.

Fire Resistance Rating 711.2.4

- Mixed occupancies
- Fire areas
- Dwelling units & sleeping units
- Smoke compartments
- Incidental uses

711.2.3 Supporting construction

- The supporting construction shall be protected to afford the required fire-resistance rating of the horizontal assembly supported.

Vertical Openings 712

- The provisions of this section shall apply to the vertical opening applications listed in Sections 712.1.1 through 712.1.16.
Shaft enclosures 712.1.1

- Vertical openings contained entirely within a shaft enclosure complying with Section 713 shall be permitted.

Escalator Openings 712.1.3

Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, an escalator opening shall be protected according to Section 712.1.3.1 or 712.1.3.2.

Opening size 712.1.3.1

- Protection by a draft curtain and closely spaced sprinklers in accordance with NFPA 13 shall be permitted where the area of the vertical opening between stories does not exceed twice the horizontal projected area of the escalator.
- In other than Groups B and M, this application is limited to openings that do not connect more than four stories.

Automatic shutters 712.1.3.2

- Protection of the opening by approved shutters at every penetrated floor shall be permitted in accordance with this section.
- The shutters shall be of noncombustible construction and have a fire-resistance rating of not less than 1.5 hours.
- The shutter shall be so constructed as to close immediately upon the actuation of a smoke detector installed in accordance with Section 907.3.1 and shall completely shut off the well opening.
- Escalators shall cease operation when the shutter begins to close.
- The shutter shall operate at a speed of not more than 30 feet per minute and shall be equipped with a sensitive leading edge to arrest its progress where in contact with any obstacle, and to continue its progress on release there from.
Atriums 712.1.7

- In other than Group H occupancies, atriums complying with Section 404 shall be permitted.

Two-story openings 712.1.9

- In other than Groups I-2 and I-3, a floor opening that is not used as one of the applications listed in this section shall be permitted if it complies with all of the items below.
  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.
  4. Is not concealed within the construction of a wall or a floor/ceiling assembly.
  5. Is not open to a corridor in Group I and R occupancies.
  6. Is not open to a corridor on nonsprinklered floors.
  7. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures.

Vertical Openings 712.1

- 712.1.2 Unconcealed vertical openings totally within an individual residential dwelling unit and connecting four stories or less shall be permitted.
- 712.1.4 Penetrations shall be protected in accordance with Section 714.
- 712.1.5 Joints shall be permitted where complying with Section 715.
- 712.1.6 Penetrations by ducts shall be protected in accordance with Section 717.6. Grease ducts shall be protected in accordance with the International Mechanical Code.
- 712.1.8 Approved masonry chimneys shall be permitted where the annular space is fireblocked at each floor level in accordance with Section 718.2.5.
Vertical Openings
712.1

• 712.1.11 Vertical openings between a mezzanine complying with Section 505 and the floor below shall be permitted.

• 712.1.12 Vertical openings containing exit access stairways or ramps in accordance with Section 1019 shall be permitted.

• 712.1.13 Vertical openings shall be permitted where protected by floor fire doors in accordance with Section 711.8.

• 712.1.14 In Group I-3 occupancies, vertical openings shall be permitted in accordance with Section 408.5.

Vertical Openings
712.1

• 712.1.15 Skylights and other penetrations through a fire-resistance-rated roof deck or slab are permitted to be unprotected, provided that the structural integrity of the fire-resistance-rated roof assembly is maintained.

Shaft Enclosures
713

• The provisions of this section shall apply to shafts required to protect openings and penetrations through floor/ceiling and roof/ceiling assemblies.

• Interior exit stairways and ramps shall be enclosed in accordance with Section 1023.
Fire-Resistance Rating
713.4
• Four stories or more
  – two-hour
• Less than four stories
  – one-hour
• Includes basements, but not mezzanines
• Not less than the floor assembly penetrated, but need not exceed 2 hours

Continuity
713.5
• Shaft enclosures shall be constructed as fire barriers or horizontal assemblies, or both, and shall have continuity in accordance with Section 707.5 for fire barriers or Section 711.4 for horizontal assemblies as applicable.

Enclosure at the Bottom
713.11
• Shafts that do not extend to bottom of building
  – Enclosed as lowest level with the same rating as shaft
  – Enclosed room with same rating as shaft
  – Approve Fire dampers

Enclosure at the Bottom
713.11
• Exceptions:
  1. The fire-resistance-rated room separation is not required, provided there are no openings in or penetrations of the shaft enclosure to the interior of the building except at the bottom. The bottom of the shaft shall be closed off around the penetrating items with materials permitted by Section 718.3.1 for draftstopping, or the room shall be provided with an approved automatic sprinkler system.
  2. A shaft enclosure containing a refuse chute or laundry chute shall not be used for any other purpose and shall terminate in a room protected in accordance with Section 713.13.4.
  3. The fire-resistance-rated room separation and the protection at the bottom of the shaft are not required provided there are no combustibles in the shaft and there are no openings or other penetrations through the shaft enclosure to the interior of the building.
Enclosure at the Top
713.12

- A shaft enclosure that does not extend to the underside of the roof deck of the building shall be enclosed at the top with construction of the same fire-resistance rating as the topmost floor penetrated by the shaft but not less than the fire-resistance rating required for the shaft enclosure.

Penetrations
714.1

- The provisions of this section shall govern the materials and methods of construction used to protect through penetrations and membrane penetrations of horizontal assemblies and fire-resistance-rated wall assemblies.

Installation Details
714.3

- Where sleeves are used, they shall be securely fastened to the assembly penetrated.
- The space between the item contained in the sleeve and the sleeve itself and any space between the sleeve and the assembly penetrated shall be protected in accordance with this section.
Installation Details

714.3

- Insulation and coverings on or in the penetrating item shall not penetrate the assembly unless the specific material used has been tested as part of the assembly in accordance with this section.

Fire-Resistance-Rated Walls

714.4

- Penetrations into or through:
  - fire walls
  - fire barriers
  - fire partitions
  - smoke barrier walls
  - Must also comply with 714.4.4

Penetrations

Exceptions

- Annular space around steel, ferrous or copper pipes or steel conduits shall be permitted to be protected as follows:
  - In concrete or masonry walls where the penetrating item is a maximum 6-inch nominal diameter and the opening is a maximum 144 square inches, concrete, grout or mortar is permitted where it installed the full thickness of the wall or the thickness required to maintain the fire-resistance rating; or
  - 2. The material used to fill the annular space shall prevent the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E119 or UL 263 time temperature fire conditions under a minimum positive pressure differential of 0.01 inch of water at the location of the penetration for the time period equivalent to the fire-resistance rating of the construction penetrated.
Membrane Penetrations 714.4.2

- Membrane penetrations shall comply with Section 714.3.1.

- Where walls or partitions are required to have a fire-resistance rating, recessed fixtures shall be installed such that the required fire resistance will not be reduced.

Membrane Penetration Exceptions

- Steel electrical boxes
  - Maximum 2 hours
  - Do not exceed 16 square inches
  - Total area of 100 square inches for any 100 square foot of wall area.

- Outlet boxes on opposite sides of the wall shall be separated as shown:
  - Horizontal distance of not less than 24 inches;
  - Horizontal distance of not less than the depth of the wall cavity where the wall cavity is filled with cellulose loose fill, rock wool or slag mineral wool insulation;
  - By solid fireblocking per Section 717.2.1;
  - Protect both boxes by listed putty pads; or
  - Other listed materials and methods.

Membrane Penetration Exceptions

- Listed electrical outlet boxes tested for use in fire-resistance-rated assemblies and installed in accordance with the listing instructions
  - By the horizontal distance specified in the listing of the electrical boxes;
  - By solid fireblocking in accordance with Section 717.2.1;
  - By protecting both boxes with listed putty pads; or
  - By other listed materials and methods.

- Electrical boxes of any size or type, which have been listed as part of a wall opening protective material system and installed in accordance with the listing instructions.

- by boxes other than electrical boxes, provided such penetrating items and the annular space between the wall membrane and the box, are protected by an approved membrane penetration firestop system installed as tested in accordance with ASTM E 814 or UL 1479

- Sprinkler escutcheons

Dissimilar materials 714.4.3

- Noncombustible penetrating items shall not connect to combustible items beyond the point of firestopping unless it can be demonstrated that the fire-resistance integrity of the wall is maintained.
Horizontal assemblies 714.5

- Penetrations of a floor, floor/ceiling assembly or the ceiling membrane of a roof/ceiling assembly not required to be enclosed in a shaft shall be protected

Exceptions:
1. Penetrations by steel, ferrous or copper conduits, pipes, tubes or vents or concrete or masonry items through a single fire-resistance-rated floor assembly where the annular space is protected with materials that prevent the passage of flame and hot gases sufficient to ignite cotton waste when subjected to ASTM E 119 or UL 263.

2. Penetrations in a single concrete floor by steel, ferrous or copper conduits, pipes, tubes or vents with a maximum 6-inch nominal diameter, provided the concrete, grout or mortar is installed the full thickness of the floor or the thickness required to maintain the fire-resistance rating.

3. Penetrations by listed electrical boxes of any material.

Membrane Penetration Exceptions

- 16 sq. in. steel electrical boxes:
  - Max. 100 sq. in. in every 100 sq. ft.
- Ceiling membrane penetrations:
  - Max. 2-hour
  - Max. 16 sq. in.
  - Max. 100 sq. in. in every 100 sq. ft.
- Listed electrical outlet boxes as a part of the assembly.
- Listed electrical outlet boxes tested for use in fire-rated assembly.
- Sprinkler escutions.

Nonfire-Resistance-Rated Assemblies. - 714.6

- Noncombustible penetrating items:
  - not more than five stories are permitted, provided that the annular space is filled to resist the free passage of flame and the products of combustion with an approved noncombustible material or with a fill, void or cavity material that is tested and classified for use in through-penetration firestop systems.

- Penetrating items:
  - Not more than two stories provided that the annular space is filled with an approved material to resist the free passage of flame and the products of combustion.
Fire-Resistant Joint System

715

• Joints installed in or between fire-resistance-rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies shall be protected by an approved fire-resistant joint system designed to resist the passage of fire for a time period not less than the required fire-resistance rating of the wall, floor or roof in or between which the system is installed.

• Fire-resistant joint systems shall be tested in accordance with Section 715.3.

Joint (Definition)

702.1

• The opening in or between adjacent assemblies that is created due to building tolerances, or is designed to allow independent movement of the building in any plane caused by thermal, seismic, wind or any other loading.

Installation

715.2

• A fire-resistant joint system shall be securely installed in accordance with the manufacturer’s installation instructions and the listing criteria in or on the joint for its entire length so as not to impair its ability to accommodate expected building movements and to resist the passage of fire and hot gases.

Fire Test Criteria

715.3

• Fire-resistant joint systems shall be tested in accordance with the requirements of either ASTM E 1966 or UL 2079.
Fire Test Criteria

715.3

• ASTM E 1966 or UL 2079
• Building Joint Systems Including:
  – floor-to-floor
  – floor-to-wall
  – head-of-wall
  – wall-to-wall
• Report
  – Fire rating in hours, i.e., 1, 2, 3 or 4 hours

Exterior Curtain Wall/Floor Intersection - 715.4

• Where fire resistance-rated floor or floor/ceiling assemblies are required, voids created at the intersection of the exterior curtain wall assemblies and such floor assemblies shall be sealed with an approved system to prevent the interior spread of fire. Such systems shall be securely installed and tested in accordance with ASTM E 2307 to provide an F rating for a time period at least equal to the fire-resistance rating of the floor assembly.
• Height and fire-resistance requirements for curtain wall spandrels shall comply with Section 705.8.5.

Exterior curtain wall/nonfire-resistance-rated floor assembly intersections - 715.4.1

• Voids created at the intersection of exterior curtain wall assemblies and nonfire-resistance-rated floor or floor/ceiling assemblies shall be sealed with an approved material or system to retard the interior spread of fire and hot gases between stories.
Spandrel Wall
715.5

- Height and fire-resistance requirements for curtain wall spandrels shall comply with Section 705.8.5.
- Where Section 705.8.5 does not require a fire-resistance-rated spandrel wall, the requirements of Section 715.4 shall still apply to the intersection between the spandrel wall and the floor.

Fire-Resistant Joint Systems
In Smoke Barriers - 715.6

- Fire-resistant joint systems in smoke barriers, and joints at the intersection of a horizontal smoke barrier and an exterior curtainwall, shall be tested in accordance with the requirements of UL 2079 for air leakage.
- The L rating of the joint system shall not exceed 5 cfm per linear foot of joint at 0.30 inch of water for both the ambient temperature and elevated temperature tests.

Opening Protectives
716.1

- Opening protectives required by other sections of this code shall comply with the provisions of this section and shall be installed in accordance with NFPA 80.

Marking fire-rated glazing assemblies - 716.1.2.2

- Fire-rated glazing assemblies shall be marked in accordance with Tables 716.1(1-3).

<table>
<thead>
<tr>
<th>TABLE 716.1(1) MARKING FIRE-RATED GLAZING ASSEMBLIES</th>
<th>FIRE TEST STANDARD</th>
<th>MARKING</th>
<th>DEFINITION OF MARKING</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM E119 or UL 263</td>
<td>W</td>
<td>Meets wall assembly criteria.</td>
<td></td>
</tr>
<tr>
<td>ASTM E119 or UL 263</td>
<td>FC</td>
<td>Meets fire/ceiling criteria.</td>
<td></td>
</tr>
<tr>
<td>NFPA 257 or UL 9</td>
<td>OR</td>
<td>Meets fire window assembly criteria including the hose stream test.</td>
<td></td>
</tr>
<tr>
<td>NFPA 352 or UL 108 or UL 10C</td>
<td>H</td>
<td>Meets fire door assembly hose stream test.</td>
<td></td>
</tr>
<tr>
<td>Meets 45°F temperature rise criteria (4x30 minutes)</td>
<td>T</td>
<td>Meets 45°F temperature rise criteria (4x30 minutes)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>XXX</td>
<td>The time in minutes of the fire resistance or fire protection rating of the glazing assembly.</td>
<td></td>
</tr>
</tbody>
</table>

For 90°C x (39-120) K
a. See Section 1408.1
Fire-Resistance-Rated Glazing 716.1.2.3

- Fire-resistance-rated glazing tested as part of a fire-resistance-rated wall or floor/ceiling assembly in accordance with ASTM E 119 or UL 263 and labeled in accordance with Section 703.6 shall not otherwise be required to comply with this section where used as part of a wall or floor/ceiling assembly.

Door Closing 716.2.6.1

- Fire doors shall be latching and self- or automatic-closing in accordance with this section.

Exceptions:
- 1. Fire doors located in common walls separating sleeping units in Group R-1 shall be permitted without automatic- or self-closing devices.
- 2. The elevator car doors and the associated hoistway enclosure doors at the floor level designated for recall in accordance with Section 3003.2 shall be permitted to remain open during Phase I emergency recall operation.
716.2.6.2 Latch required

- Unless otherwise specifically permitted, single side-hinged swinging fire doors and both leaves of pairs of side-hinged swinging fire doors shall be provided with an active latch bolt that will secure the door when it is closed.

Labeling Requirements 716.2.9.1

- Fire doors shall be labeled showing the name of the manufacturer or other identification readily traceable back to the manufacturer, the name or trademark of the third-party inspection agency, the fire protection rating.
  - Maximum transmitted temperature end point for exit enclosures and passageways
  - Smoke and draft control doors
  - Approved and permanently affixed.
  - Applied at the factory

Smoke & Draft Control Doors 716.2.9.1

- Smoke and draft control doors complying with UL 1784 shall be labeled in accordance with Section 716.4.6.1 and shall show the letter “S” on the fire rating label of the door.
- This marking shall indicate that the door and frame assembly are in compliance when listed or labeled gasketing is also installed.

Fire Door Frames 716.2.9.4

- Fire door frames shall be labeled showing the names of the manufacturer and the third-party inspection agency.
2018 Fire-Resistance Rated Construction

716.3.2.1.2 Area limitations

• The total area of the glazing in fire-protection-rated window assemblies shall not exceed 25 percent of the area of a common wall with any room.

Ducts And Air Transfer Openings - 717.1

• The provisions of this section shall govern the protection of duct penetrations and air transfer openings in assemblies required to be protected and duct penetrations in nonfire-resistance-rated floor assemblies.

716.3.5.2 Labeling requirements

• Fire-protection-rated glazing shall bear a label or other identification showing the name of the manufacturer, the test standard and information required in Section 716.1.2.2.2 and Table 716.1(3) that shall be issued by an approved agency and permanently identified on the glazing.

717.1.1 - Ducts and air transfer openings

• Ducts transitioning horizontally between shafts shall not require a shaft enclosure provided that the duct penetration into each associated shaft is protected with dampers complying with this section.
Ducts And Air Transfer Openings Without Dampers - 717.1.2

- Ducts that penetrate fire-resistance-rated walls and are not required by this section to have fire dampers shall comply with the requirements of Sections 714.3 through 714.4.3.
- Ducts that penetrate horizontal assemblies not required to be contained within a shaft and not required by this section to have fire dampers shall comply with the requirements of Sections 714.5 through 714.6.2.

Installation 717.2

- Fire dampers, smoke dampers, combination fire/smoke dampers and ceiling radiation dampers located within air distribution and smoke control systems shall be installed in accordance with the requirements of this section, the manufacturer’s installation instructions and the damper’s listing.

Damper Testing And Ratings 717.3.1

- Dampers shall be listed and labeled in accordance with the following standards:
  - Fire dampers — UL 555.
  - Smoke dampers — UL 555S.
  - Combination fire/smoke dampers — UL 555 and UL 555S.
  - Ceiling radiation dampers — UL 555C.
  - Corridor dampers — UL 555 and UL 555S

Fire Damper Rating 717.3.2.1

- Fire dampers shall have the minimum rating specified in Table 717.3.2.1

<table>
<thead>
<tr>
<th>Type of Penetration</th>
<th>Minimum Damper Rating (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 3-hour fire-resistance-rated assemblies</td>
<td>1.5</td>
</tr>
<tr>
<td>3-hour or greater fire-resistance-rated assemblies</td>
<td>3</td>
</tr>
</tbody>
</table>
**Access And Identification 717.4**

- Large enough to permit inspection and maintenance of the damper and its operating parts.
- Shall not affect the integrity of fire-resistance-rated assemblies.
- Shall not reduce the fire-resistance rating of the assembly.
- Shall be permanently identified on the exterior by a label:
  - letters not less than 0.5 inch in height reading: SMOKE DAMPER or FIRE DAMPER.
- Shall be tight fitting and suitable for the required duct construction.

**Where required 717.5**

- Fire, dampers, smoke dampers, combination fire/smoke dampers, ceiling radiation dampers and corridor dampers shall be provided at the locations prescribed in Sections 717.5.1 through 717.5.7 and 717.6.
- Where an assembly is required to have both fire dampers and smoke dampers, combination fire/smoke dampers or a fire damper and a smoke damper shall be provided.

**Fire Walls 717.5.1**

- Ducts and air transfer openings permitted in fire walls in accordance with Section 705.11 shall be protected with approved fire dampers.
- A listed smoke damper shall be provided at each point a duct or air transfer opening penetrates a fire wall that serves as a horizontal exit.

**Horizontal exits 717.5.1.1**

- A listed smoke damper designed to resist the passage of smoke shall be provided at each point a duct or air transfer opening penetrates a fire wall that serves as a horizontal exit.
Fire Barriers

717.5.2

- Ducts and air transfer openings of fire barriers shall be protected with listed fire dampers installed in accordance with their listing.
- Ducts and air transfer openings shall not penetrate enclosures for interior exit stairways and ramps and exit passageways, except as permitted by Sections 1023.5 and 1024.6, respectively.

Fire Barrier Exceptions

• 1. Penetrations are tested in accordance with ASTM E119 or UL 263 as part of the fire-resistance-rated assembly.

• 2. Ducts are used as part of an approved smoke control system in accordance with Section 909.

Fire Barrier Exceptions

• 3. Such walls are penetrated by ducted HVAC systems
  - required fire-resistance rating of 1 hour or less
  - in areas of other than Group H
  - building equipped throughout with an NFPA 13 or 13R sprinkler system
  - a ducted HVAC system shall be a duct system for conveying supply, return or exhaust air as part of the structure’s HVAC system.
  - Constructed of sheet steel not less than 26 gage
  - shall be continuous from the air-handling appliance or equipment to the air outlet and inlet terminals.

Horizontal exits

717.5.2.1

- A listed smoke damper designed to resist the passage of smoke shall be provided at each point a duct or air transfer opening penetrates a fire barrier that serves as a horizontal exit.
Shaft Enclosures
717.5.3

- Shaft enclosures that are permitted to be penetrated by ducts and air transfer openings shall be protected with listed fire and smoke dampers installed in accordance with their listing.

Shaft Exceptions

1. Fire dampers are not required at penetrations of shafts where:
   1.1 Steel exhaust subducts extended at least 22 inches vertically in exhaust shafts provided there is a continuous airflow upward to the outside,

2. In Group B and R occupancies, equipped throughout with NFPA 13 sprinklers, smoke dampers are not required at penetrations of shafts where:
   - Kitchen, clothes dryer, bathroom and toilet room exhaust openings with steel exhaust subducts, having a wall thickness of at least 26 gage
   - Subduct extend at least 22 inches vertically, and
   - An exhaust fan is installed at the upper terminus of the shaft that is powered continuously in accordance with the provisions of Section 909.11, so as to maintain continuous upward airflow to the outside.
Shaft Exceptions

3. Smoke dampers are not required at penetration of exhaust or supply shafts in parking garages that are separated from other building shafts by not less than 2-hour fire-resistance-rated construction.

4. Smoke Control Systems

5. Kitchen and clothes dryer exhaust systems

Fire Partition Exceptions

Fire Partition Exceptions (In other than H Occ.)

1. Corridor walls in buildings equipped throughout with an NFPA 13 or 13 R automatic sprinkler system and the duct is protected as a through penetration in accordance with Section 714.

2. Tenant partitions in covered mall buildings where the walls are not required by provisions elsewhere in the code to extend to the underside of the floor or roof sheathing, slab or deck above.

Fire Partitions

717.5.4

- Duct penetrations in fire partitions shall be protected with approved fire dampers installed in accordance with their listing.

Fire Partition Exceptions

- Duct is approved materials in accordance with the IMC and all of the following minimum requirements:
  1. Maximum 100 square inches.
  2. Minimum of 0.0217 inch thick steel.
  3. No openings that communicate between the corridor with adjacent spaces or rooms.
  4. Installed above a ceiling.
  5. Cannot terminate at a wall register in the fire-resistance-rated wall.
  6. A minimum 12-inch by 0.060-inch-thick steel sleeve shall be centered in each duct opening. Secured to both sides of the wall and all four sides of the sleeve with minimum 11/2-inch by 11/2-inch by 0.060-inch steel retaining angles. The annular space between the steel sleeve and wall opening shall be filled with rock wool batting on all sides.
Corridors 717.5.4.1

- Duct and air transfer openings that penetrate corridors shall be protected with dampers as follows:

  - 1. A corridor damper shall be provided where corridor ceilings, constructed as required for the corridor walls as permitted in Section 708.4, Exception 3, are penetrated.

  - 2. A ceiling radiation damper shall be provided where the ceiling membrane of a fire-resistance-rated floor-ceiling or roof-ceiling assembly, constructed as permitted in Section 708.4, Exception 2, is penetrated.

  - 3. A listed smoke damper designed to resist the passage of smoke shall be provided at each point a duct or air transfer opening penetrates a corridor enclosure required to have smoke and draft control doors in accordance with Section 716.5.3.

Corridor Exceptions

- Smoke Control System
- Not required in corridor penetrations where the duct is constructed of steel not less than 0.019-inch in thickness and there are no openings serving the corridor.
Smoke Barriers 717.5.5

- A listed smoke damper designed to resist the passage of smoke shall be provided at each point a duct or air transfer opening penetrates a smoke barrier.
  - Exceptions:
    - 1. Smoke dampers are not required where the openings in ducts are limited to a single smoke compartment and the ducts are constructed of steel.
    - 2. Fully ducted system in sprinklered I-2, Condition 2

Exterior walls 717.5.6

- Ducts and air transfer openings in fire-resistance-rated exterior walls required to have protected openings in accordance with Section 705.10 shall be protected with listed fire dampers installed in accordance with their listing.

Smoke partitions 717.5.7

- A listed smoke damper shall be provided at each point that an air transfer opening penetrates a smoke partition.

Exception: Smoke control system, approved alternative protection shall be utilized.

Horizontal Assemblies 717.6

- Penetrations by ducts and air transfer openings of a floor, floor/ceiling assembly or the ceiling membrane of a roof/ceiling assembly shall be protected by a shaft enclosure that complies with Section 708 or shall comply with this section.
Through Penetrations 717.6.1

- In occupancies other than Groups I-2 and I-3, a duct and air transfer opening system constructed of approved materials in accordance with the International Mechanical Code that penetrates a fire-resistance-rated floor/ceiling assembly that connects not more than two stories is permitted without shaft enclosure protection provided a fire damper is installed at the floor line.

Horizontal Penetration Exception

- A duct is permitted to penetrate three floors or less without a fire damper at each floor provided it meets all of the following:
  1. The duct shall be contained and located within the cavity of a wall and shall be constructed of steel not less than 26 gauge in thickness.
  2. The duct shall open into only one dwelling unit or sleeping unit and the duct system shall be continuous from the unit to the exterior of the building.
  3. The duct shall not exceed 4-inch nominal diameter and the total area of such ducts shall not exceed 100 square inches any 100 square feet of floor area.
  4. Annular space must be protected with materials to prevent the passage of flame and hot gases.
  5. Grille openings in rated horizontal assembly must be protected with ceiling radiation damper.

Membrane Penetrations 717.6.2

- Ducts & air transfer openings that penetrate the ceiling membrane of a fire-resistance-rated horizontal assembly shall be protected with one of the following:
  - Shaft Enclosure
  - Ceiling radiation damper where duct penetrates ceiling
  - Ceiling radiation damper at a diffuser without a duct.

Nonfire-resistance-rated Floor Assemblies - 717.6.3

- Duct systems constructed of approved materials in accordance with the IMC that penetrate nonfire-resistance-rated floor assemblies shall be protected by any of the following methods:
  1. A shaft enclosure.
  2. The duct connects not more than two stories, the annular space around the penetrating duct is protected with an approved noncombustible material that resists the free passage of flame and the products of combustion.
  3. In floor assemblies composed of noncombustible materials, a shaft shall not be required where the duct connects not more than three stories, the annular space around the penetrating duct is protected with an approved noncombustible material that resists the free passage of flame and the products of combustion and a fire damper is installed at each floor line.

Exception: Ducts within individual residential dwelling units.
Flexible Ducts And Air Connectors - 717.7

- Flexible ducts and air connectors shall not pass through any fire-resistance-rated assembly. Flexible air connectors shall not pass through any wall, floor or ceiling.

Concealed Spaces 718

- Combustible concealed locations
  - Fireblocking
  - Draftstopping in floors
  - Draftstopping in attics

Fireblocking 718.2

- In combustible construction, fireblocking shall be installed to cut off concealed draft openings (both vertical and horizontal) and shall form an effective barrier between floors, between a top story and a roof or attic space.

Fireblocking Materials 718.2.1

- 2-inch nominal lumber
- Two thicknesses of 1-inch nominal w/lapped joints
- One thickness of 0.719-inch wood structural panel w/joints backed
- One thickness of 0.75-inch particleboard w/joints blocked
- ½ inch gypsum board
- ¼ inch Cement-based millboard
- Batts or blankets of mineral wool or glass or other approved materials installed in such a manner as to be securely retained in place
- Cellulose insulation installed as tested for the specific application.
Double Stud Walls
718.2.1.1

- Batts or blankets of mineral wool or mineral fiber or other approved nonrigid materials shall be permitted for compliance with the 10-foot horizontal fireblocking in walls constructed using parallel rows of studs or staggered studs.

Concealed Wall Spaces
718.2.2

- Fireblocking shall be provided in concealed spaces of stud walls and partitions, including furred spaces, and parallel rows of studs or staggered studs, as follows:
  a. Vertically at the ceiling and floor levels.
  b. Horizontally at intervals not exceeding 10 feet.

Connections Between Horizontal & Vertical Spaces – 718.2.3

- Interconnections between concealed vertical stud wall or partition spaces and concealed horizontal spaces
- Between concealed vertical and horizontal spaces such as occur at soffits, drop ceilings, cove ceilings and similar locations.

Stairways
718.2.4

- in concealed spaces between stair stringers at the top and bottom of the run

2x Fire stop at top and bottom between stringers
Ceiling & Floor Openings 718.2.5

- Where required by Exception 6 of Section 708.2, Exception 1 of Section 714.4.1.2 or Section 713.4.2, fireblocking of the annular space around vents, pipes, ducts, chimneys and fireplaces at ceilings and floor levels shall be installed with a material specifically tested in the form and manner intended for use to demonstrate its ability to remain in place and resist the free passage of flame and the products of combustion.

Architectural Trim 718.2.6

- Within concealed spaces of exterior wall coverings and other exterior combustible architectural elements or where erected with combustible frames
  - at maximum intervals of 20 feet.
  - Noncontinuous elements shall have closed ends, with at least 4 inches of separation between sections.

Concealed Sleeper Spaces 718.2.7

- Where wood sleepers are used for laying wood flooring on masonry or concrete fire-resistance-rated floors
- No open spaces exceeding 100 square feet and under permanent partitions

Draftstopping In Floors 718.3

- Draftstopping shall be installed to subdivide floor/ceiling assemblies where required by Section 708.4.2.
- In other than Group R occupancies, draftstopping shall be installed to subdivide combustible floor/ceiling assemblies so that horizontal floor areas do not exceed 1,000 square feet
  - NFPA 13 Exception
708.4.2 Fireblocks and draftstops in combustible construction

- In combustible construction where fire partitions do not extend to the underside of the floor or roof sheathing, deck or slab above, the space above and along the line of the fire partition shall be provided with one of the following:
  1. Underside of the floor or roof sheathing, deck or slab above
  2. Underside of the floor or roof sheathing, deck or slab above.

Exceptions!

Draftstopping Materials 718.3.1

- 0.5-inch gypsum board,
- 0.375-inch wood structural panel,
- 0.375-inch particleboard
- Other approved materials adequately supported
- The integrity of draftstops shall be maintained.

Questions?
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