Following contains common verbiage found in major model building codes and has been edited for the purpose of inclusion on this CD. Included are selected sections of codes taken directly from:

- 1997 Uniform Building Code, Chapter 7, Fire-Resistant Materials and Construction
- Standard Building Code 1997, Chapter 7, Fire-Resistant Materials and Construction
- The BOCA National Building Code/1996, Chapter 7, Fire-Resistant Materials and Construction
- International Building Code 2000, Chapter 7, Fire Resistant Materials and Construction

Non-exhaustive for through-penetration fire systems.

1997 UNIFORM BUILDING CODE

Chapter 7

FIRE-RESISTANT MATERIALS AND CONSTRUCTION

SECTION 706 – FIRE-RESISTIVE JOINT SYSTEMS

706.1 General. Joints installed in or between fire-resistive walls, fire-resistive floor or floor-ceiling assemblies and fire-resistive roof or roof-ceiling assemblies shall be protected by an approved fire-resistive joint system designed to resist the passage of fire for a time period not less than the required fire-resistance rating of the floor, roof or wall in or between which it is installed. Fire-resistive joint systems shall be tested in accordance with Section 706.2.

EXCEPTION: Fire-resistive joint systems are not required for joints in the following locations:

1 Floors within a single dwelling unit.

2 Floors where the joint is protected by a shaft enclosure in accordance with Section 711.

3 Floors with atriums where the space adjacent to the atrium is included in the volume of the atrium for smoke-control purposes.

4 Floors within malls.

5 Floors within open parking structures.

6 Mezzanine floors.

7 Walls that are permitted to have unprotected openings.

8 Roofs where openings are permitted.

Such material or construction assembly shall be securely installed in or on the joint for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to resist the passage of fire and hot gasses.

706.2 Fire-resistive Joint System. Fire-resistive joint systems shall be tested in accordance with UBC Standard 7-1 under the following conditions:

1 Joint systems shall be installed full height in wall assemblies and full length in floor and roof assemblies.

2 Floor and roof assemblies shall be tested with a minimum positive pressure differential of 0.01 inch of water column (2.5 Pa).

3 Wall assemblies shall be tested with a minimum positive pressure differential of 0.01 inch of water column (2.5 Pa) measured at the mid-height of the wall assembly.

4 Joint systems shall contain a splice. For wall assemblies, the splice shall be located above the mid-height of the wall assembly.

5 Joint systems shall be tested at the maximum joint width for which they are designed. Joint systems designed to accommodate movement shall be expanded to the maximum joint opening width for which they are intended to function.

6 Joint systems designed to be load-bearing shall be loaded to the maximum design load in accordance with their intended application.

7 Joint systems designed to accommodate movement shall be preconditioned by cycling between the minimum and the maximum joint opening width for which they are intended to function for the number of cycles specified in Table 7-D.

8 Nonsymmetrical wall joint systems shall be tested in accordance with Sections 706 and 709.5.

SECTION 709 – WALLS AND PARTITIONS

709.6 Through Penetrations

709.6.1 General. Through penetrations of the fire-resistive walls shall comply with Section 709.6.2 or 709.6.3.

709.6.2 Fire-rated assembly. Penetrations shall be installed as tested in the approved UBC Standard 7-1 rated assembly.

709.6.3 Penetration firestop system. Penetrations shall be protected by an approved penetration firestop system installed as tested in accordance with UBC Standard 7-5 and shall have an F rating of not less than the required rating of the wall penetrated.

709.7 Membrane Penetrations. Membrane penetrations of the fire-resistive walls shall comply with Section 709.6.

709.8 Joints. The protection of joints shall comply with the requirements of Section 706.

SECTION 710 – FLOOR CEILINGS OR ROOF CEILINGS

710.2 Through Penetrations

710.2.1 General. Through penetrations of fire-resistive horizontal assemblies shall be enclosed in fire-resistive shaft enclosures in accordance with Section 711.1 or shall comply with Section 710.2.2 or 710.2.3.

710.2.2 Fire-rated assemblies. Penetrations shall be installed as tested in the approved UBC Standard 7-1.

710.2.3 Penetration Firestop System. Penetration shall be protected by an approved penetration firestop system installed as tested in accordance with UBC Standard 7-5. The system shall have an F rating and a T rating of not less than one hour but not less than the required rating of the floor penetrated.

EXCEPTION: Floor penetrations contained and located within the cavity of a wall do not require a T rating.

710.3 Membrane Penetrations. Penetrations of membranes that are part of a fire-resistive horizontal assembly shall comply with Section 710.2.

710.6 Joints. The protection of joints in fire-resistive floors and roofs shall comply with the requirements of Section 706.

SECTION 711 – SHAFT ENCLOSURES

711.3 Special Provision

. . . Openings made through a floor for penetrations such as cables, cable trays, conduit, pipes or tubing that are protected with approved through-penetration fire stops to provide the same degree of fire resistance as the floor construction need not be enclosed. For floor-ceiling assemblies, see Section 710.

SECTION 714 – THROUGH-PENETRATION FIRE STOPS

Through-penetration fire stops required by this code shall have an F or T rating as determined by tests conducted in accordance with UBC Standard 7-5.

Through-penetration fire stops may be used for membrane penetrations.

The F rating shall apply to all through penetrations and shall not be less than the required fire-resistance rating of the assembly penetrated.

The T rating shall apply to those through-penetration locations required to have T ratings as specified in Section 710.3 and shall not be less than the required fire-resistance rating of the assembly penetrated.

Where sleeves are used, the sleeves shall be securely fastened to the assembly penetrated. All 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. Insulation and coverings on the penetrating item shall not penetrate the assembly unless the specific materials used have been tested as part of the assembly.

STANDARD BUILDING CODE 1997

Chapter 7

FIRE RESISTANT

MATERIALS AND CONSTRUCTION

SECTION 701 GENERAL

701.2.5 Where materials, systems or devices incorporated into a fire resistant assembly have not been tested as part of the assembly, sufficient data shall be made available to the building official to show that the required fire resistance rating is not reduced. Materials and methods of construction used to protect joints and penetrations in fire resistant building assemblies shall not reduce the required fire resistance rating.

SECTION 704 FIRE RESISTANT SEPARATIONS

704.2.1.3 All other partitions required to have a fire resistance rating shall extend from the top of the floor below to the ceiling above and shall be securely attached thereto. Where said ceiling is not a part of an assembly having a fire resistance rating at least equal to that required for the partition, the partition shall be constructed tight against the floor or roof deck above.

704.2.1.5 Any required smoke barrier shall be continuous from outside wall to outside wall, from floor slab to floor slab or roof deck, from smoke barrier to smoke barrier, or a combination thereof, including continuity through all concealed spaces such as those found above suspending ceilings however, smoke barriers are not required in interstitial spaces designed and constructed with ceilings equivalent to smoke barriers. Smoke barriers shall be of 1-hour fire resistant construction. Fixed wired glass vision panels shall be permitted in such barriers provided the panels do not individually exceed an area of 1,296 sq. in. (0.84 m^2) and are mounted in steel frames. There is no restriction on the total number of such panels in any barrier.

704.2.2.2 Group I Unrestrained. Smoke barriers shall have a minimum 1-hour fire resistance rating and be constructed in accordance with 704.2.1.5.

SECTION 705 PROTECTION OF OPENINGS

705.3.1.5 Any openings between the edge of a floor deck and an exterior wall shall be sealed using an approved material or assembly of materials designed and tested for this purpose. The material shall remain in place, sealing the opening, for a time period of at least equal to the required fire resistance rating of the floor deck.

705.4 Protection of penetrations

705.4.1 General. Protection of penetrations through fire rated and nonfire rated assemblies shall comply with 705.5 and 705.6.

705.5 Penetrations of fire rated walls

705.5.1 Through-Penetrations. Through-penetrations of fire rated walls shall comply with 705.5.1.1 or 705.5.1.2.

705.5.1.2 Penetration firestop system. Penetrations shall be protected by an approved penetration firestop system installed as tested in accordance with ASTM E 814, with a minimum positive pressure differential of 0.01 inch of water and shall have an F rating of not less than the required rating of the wall penetrated.

705.5.2 Membrane penetrations. Membrane penetrations shall comply with 705.5.1 through 705.5.1.2.

705.6 Penetrations of horizontal assemblies

705.6.1 Through-Penetrations. Through-penetrations of fire rated horizontal assemblies shall comply with 705.6.1.1 or 705.6.1.2.

705.6.1.2 Penetration firestop system. Penetrations shall be protected by an approved penetration firestop system installed as tested in accordance with ASTM E 814, with a minimum positive pressure differential of 0.01 inch of water. The system shall have an F rating and a T rating of not less than 1 hour but not less than the required rating of the floor penetrated.

EXCEPTION: Floor penetrations contained and located within the cavity of a wall do not require a T rating.

705.6.2 Membrane penetrations. Penetrations of membranes which are part of a fire rated horizontal assembly shall comply with 705.6.1 and 705.6.1.2.

705.7 Fire Resistant Joint Systems

705.7.1 General. Joints installed in or between fire resistant walls, fire resistant floor or floor/ceiling assemblies and fire resistant roof 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 it is installed. Fire resistant joint systems shall be installed and tested in accordance with 705.7.

EXCEPTION: Fire resistant joint systems shall not be required for joints in the following locations:

1 Floors within a single dwelling unit.

2 Floors where the joint is protected by a shaft enclosure in accordance with 705.2.

3 Floors within atriums where the space adjacent to the atrium is included in the volume of the atrium for smoke-control purposes.

4 Floors within malls.

5 Floors within open parking structures.

6 Mezzanine floors.

7 Walls which are permitted to have unprotected openings.

705.7.2 Fire test. Fire resistant joint systems shall be tested in accordance with ASTM E 119 under the following conditions:

1 Joint systems shall be installed full height in wall assemblies and full length in floor and roof assemblies.

2 Floor and roof assemblies shall be tested with a minimum positive pressure differential of 0.01 inch of water column (2.5 Pa).

3 Wall assemblies shall be tested with a minimum positive pressure differential of 0.01 inch of water column (2.5 Pa) measured at the mid-height of the wall assembly.

4 Joint systems shall contain a splice. For wall assemblies the splice shall be located above the mid-height of the wall assembly.

5 Joint systems shall be tested at the maximum joint width for which they are designed. Joint systems designed to accommodate movement shall be expanded to the maximum joint opening width for which they are intended to function.

6 Joint systems designed to be loadbearing shall be loaded to the maximum design load in accordance with their intended application.

7 Joint systems designed to accommodate movement shall be preconditioned by cycling between the minimum and the maximum joint opening width for which they are intended to function for the number of cycles specified in Table 705.7 in accordance with ASTM E 1399.

8 Asymmetrical wall joint systems shall be tested in accordance with 701.2.4 and 705.7.2.

TABLE 705.7
PRECONDITIONING CYCLES FOR FIRE RESISTANT JOINT SYSTEMS

TYPE OF JOINT SYSTEM	NUMBER OF CYCLES
Expansion/Contraction	500
Seismic	100
Wind sway	500

705.7.3 Installation. Fire resistant joint systems shall be securely installed in or on the joint for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to resist the passage of fire and hot gases.

705.7.4 Walls. The protection of joints in fire resistant walls shall comply with the requirements of 705.7.

705.7.5 Floors and roofs. The protection of joints in fire resistant floors and roofs shall comply with the requirements of 705.7.

THE BOCA NATIONAL BUILDING CODE/1996

Chapter 7

FIRE RESISTANT MATERIALS AND CONSTRUCTION

709.7.1 Fireresistive Joint systems: Fireresistive joint systems shall be tested in accordance with ASTM E119 listed in Chapter 35 under the following conditions:

1. The joint system shall be installed full height in wall assemblies and full length in floor assemblies.
2. Floor and roof assemblies shall be tested with a minimum positive pressure differential of 0.01 inch of water column (3 Pa).
3. Wall assemblies shall be tested with a minimum positive pressure differential of 0.01 inch of water column (3 Pa) measured at mid height of the wall assembly.
4. Joint systems shall contain a splice. For wall systems the splice shall be located above the mid-height of the wall.
5. Joint systems shall be tested at the maximum joint width for which they are designed. Joint systems designed to accommodate movement shall be expanded to the maximum joint opening for which they are intended to function.
6. Joint systems intended to be loadbearing shall be loaded to the maximum design load in accordance with their intended application.
7. Joint systems designed to accommodate movement shall be preconditioned by cycling between the minimum and the maximum joint opening width for which they are intended to function for the number of cycles specified in Table 709.7.

Table 709.7

Preconditioning Cycles	
Type of Joint System	**Number of Cycles**
Expansion/contraction	**500**
Seismic	**100**
Wind Sway	**500**

SECTION 712.0 SMOKE BARRIERS

712.1 Where required: Smoke barriers shall be provided as required in section 409.4 for occupancies in use group 1-2 and section 410.6 for occupancies in use group 1-3.

712.2 Construction: Smoke barriers shall have a fireresistance rating of not less than 1 hour.

SECTION 714.0 PENETRATIONS

714.1 fireresistance rated wall partitions: Penetrations through *fireresistance rated wall assemblies* shall meet the limitations specified in Section 714.1 through 714.1.6.2 Penetrations through floor/ceiling and roof/ceiling assemblies shall comply with sections 714.2 through 714.2.6.5.

714.1.1 Noncombustible penetrations: Cables and wires without combustible jackets or insulation, and noncombustible pipes, tubes, conduits and vents which penetrate a *fire wall* shall be tested in accordance with ASTM E119 listed in Chapter 35 as part of a rated assembly, or shall be protected by an approved *through-penetration protection system* in accordance with Section 714.1.3 , or the annular space around the penetrating item shall be protected in accordance with Section 714.1.4.and 714.1.4.1.

714.1.2 Combustible penetrations: Cables and wires with combustible jackets or insulation, and combustible pipes, tubes and conduits which penetrate a *fire wall* shall be tested in accordance with ASTM E119 listed in Chapter 35 as part of a fireresistance rated assembly or shall be protected by an *approved through-penetration protection system* in accordance with Section 714.1.3.

714.1.3 Through – penetration firestop system: The *through-penetration protection system* shall be tested in accordance with ASTM E814 listed in Chapter 35, with a minimum positive pressure differential of 0.01 inch of water column (3 Pa). The penetration system shall have an "F" rating of not less than the required rating of the assembly penetrated.

714.1.4 Annular space protection: Where permitted by Section 714.1.1 for non combustible penetrating items, the annular space between the penetrating item and the fireresistance rated assembly being penetrated shall be protected with a material capable of preventing the passage of flame and hot gasses sufficient to ignite cotton waste when subjected to the time-temperature fire conditions of ASTM E119 listed in Chapter 35, under a minimum pressure differential of 0.01 inch water column (3Pa) at the location of the penetration for a time period equivalent to the required fireresistance rating of the assembly penetrated or shall be protected in accordance with Section 714.1.4.1

714.1.4.1 Concrete or Masonry wall assemblies: Penetrations of concrete or masonry assemblies by maximum 6" diameter copper, iron or steel pipe, tube, conduit, or wires and cables with steel jackets shall be permitted provided that the maximum opening size is 144 square inches (.09 m^2) and the penetration is protected with concrete, grout or mortar for the full thickness of the assembly or the thickness required to provide a fireresistance rating equivalent to the fireresistance rating of the assembly penetrated.

714.1.4.2 Sleeves: Where sleeves are installed, the sleeves shall be noncombustible and shall be securely fastened to the assembly being penetrated. All space between the item contained in the sleeve and the sleeve itself and any space between the sleeves and the assembly penetrated shall be filled with materials that comply with Section 714.1.4.or 714.1.4.1.

714.1.6 Single Membrane penetrations: Openings to accommodate non-combustible conduits, pipes and tubes through a single membrane that is an integral component of a fireresistance rated wall assembly shall be permitted provided that the aggregate area of all such openings does not exceed 100 square inches in any 100 square feet(9 m^2) of wall area and the openings are fireblocked with approved noncombustible materials. (**704.4.1.1 Elementary Materials:** Materials which are intended to be classified as non combustible shall be tested in accordance with ASTM E136 listed in Chapter 35.)

714.1.6.1 Electrical outlet boxes: Openings for steel electrical outlet boxes that do not exceed 16 square inches (10323 mm^2) in area are permitted. Outlet boxes on opposite sides of the assembly shall be separated by a horizontal distance of not less than 24 inches (610mm) These limitations shall not apply to openings for electrical boxes of any material provided that such boxes are tested for installation in fireresistance rated assemblies and installed in accordance with the tested assembly.

714.2 fireresistance rated Floor/ceiling and roof/ceiling assemblies: Where permitted as an alternative to a shaft enclosure in accordance with Section 713.4, penetrations through rated floor/ceiling and roof/ceiling assemblies shall comply with Sections 714.2.1 through 714.2.6.5.

714.2.1 Noncombustible penetrations: Cables and wires without combustible jackets or insulation, and noncombustible pipes, tubes, conduits and vents which penetrate a rated floor/ceiling or roof/ceiling assembly shall be installed in accordance with the approved ASTM E119 rated assembly, or shall be protected in accordance with Section 714.2.3.

714.1.2 Combustible penetrations: Cables and wires with combustible jackets or insulation, and combustible pipes, tubes and conduits which penetrate a rated floor/ceiling or roof/ceiling assembly shall be tested in accordance with the approved ASTM E119 listed in Chapter 35 as part of a fireresistance rated assembly, or shall be protected with a through - penetration firestop system in accordance with Section 714.2.3.

714.2.3 Through–penetration firestop system: Where cables, cable trays, conduits, tubes or pipes penetrate a floor assembly, such penetrations shall be protected by a through–penetration fire stop system. Through-penetration firestop systems shall be tested in accordance with ASTM E814 listed in Chapter 35, with a minimum positive pressure differential of 0.01 inch of water column (3 Pa). The penetration system shall have an "F" and "T" rating of not less than 1 hour but not less than the required rating of the assembly penetrated.

Exceptions

1. A "T" rating shall not be required for floor penetrations that are contained and located within the cavity of a wall.
2. A "T" rating shall not be required for floor penetration by pipe, tube, and conduit that are not in direct contact with combustible material

714.2.4 Annular space protection: Where permitted by Section 714.2.1 for non combustible penetrating items, the annular space between the penetrating item and the fireresistance rated assembly being penetrated shall be protected with a material capable of preventing the passage of flame and hot gasses sufficient to ignite cotton waste when subjected to the time-temperature fire conditions of ASTM E119 listed in Chapter 35, under a minimum pressure differential of 0.01 inch water column (3Pa) at the location of the penetration for a time period equivalent to the required fireresistance rating of the assembly penetrated or shall be protected in accordance with Section 714.2.4.1

714.2.4.1 Concrete floor assemblies: Penetrations of concrete floor assemblies by maximum 6" nominal diameter copper, iron or steel pipe, tube, conduit, or wires and cables with steel jackets shall be permitted provided that the maximum opening size is 144 square inches (.09 m^2) and the penetration is protected with concrete, grout or mortar for the full thickness of the assembly or the thickness required to provide a fireresistance rating equivalent to the fireresistance rating of the assembly penetrated.

714.2.4.2 Sleeves: Where sleeves are installed, the sleeves shall be noncombustible and shall be securely fastened to the assembly being penetrated. All space between the item contained in the sleeve and the sleeve itself and any space between the sleeves and the assembly penetrated shall be filled with materials that comply with Section 714.2.4.or 714.2.4.1.

Take note:

Sleeves made out of plastic are not allowed by code, see SLEEVES.

Membrane penetrations of non combustibles must be caulked with a non combustible caulk like MC 150 or Metacaulk 950, see SINGLE MEMBRANE PENETRATIONS. Combustible penetrations through walls are still treated with a firestop system.

Concrete, grout, or mortar is allowed to firestop, SEE CONCRETE FLOOR ASSEMBLIES, for metal pipes up to 6". Opening must be completely full of material. This is not good construction practice however because it does not allow movement, expansion or contraction of the pipes.

Smoke barriers shall have a fireresistance rating of not less than 1 hour.

INTERNATIONAL BUILDING CODE 2000

Chapter 7

FIRE-RESISTANT MATERIALS AND CONSTRUCTION

702 DEFINITIONS

DRAFT STOP. A material, device or construction installed to restrict the movement of air within open spaces of concealed areas of building components such as crawl spaces, floor-ceiling assemblies, roof-ceiling assemblies and attics

FIRE RESISTANT JOINT SYSTEM. An assemblage of specific materials or products that are designed, tested, and fire resistance rated in accordance with UL 2079 to resist, for, a prescribed period of time, the passage of fire through joints made in or between fire resistance rated assemblies.

F RATING. The time period that the penetration firestop system limits the spread of fire through the penetration when tested in accordance with ASTM E 814.

SMOKE BARRIER. A continuous membrane, either vertical or horizontal, such as a wall, floor or ceiling assembly, that is designed and constructed to restrict the movement of smoke.

THROUGH PENETRATION FIRESTOP SYSTEM. An assemblage of specific materials or products that are designed, tested and fire resistance rated to resist, for a prescribed period of time, the spread of fire through penetrations. The F and T rating criteria for penetration firestop systems shall be in accordance with ASTM E 814. See definition “F” and “T” rating.

T RATING. The time period that the penetration firestop system, including the penetrating item, limits the maximum temperature rise to 325 degrees F above its initial temperature through the penetration on the nonfire side, when tested in accordance with ASTM E 814.

706 FIRE BARRIERS

706.6 Openings. Openings in a fire barrier wall shall be protected in accordance with Section 714. Openings shall be 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 120 square feet (11 m^2). Openings in exit enclosures shall also comply with Section 1008.5.

706.7 Penetrations. Penetrations through fire barriers shall comply with Section 711.

708 FIRE PARTITIONS

708.6 Openings. Openings in a fire partition shall be protected in accordance with Section 714.

708.7 Penetrations. Penetrations through fire partitions shall comply with Section 711.

709 SMOKE BARRIERS

709.3 Fire resistance rating. A 1-hour fire resistance rating is required for smoke barriers.

709.4 Continuity. Smoke barriers shall form an effective membrane continuous from outside wall to outside wall and from floor slab to floor or roof deck above, including continuity through concealed spaces, such as those found above suspended ceilings, and including interstitial structural and mechanical spaces. The supporting construction shall be protected to afford the required fire resistance rating of the wall or floor supported in buildings of other than Type II B, III B, or V B construction.

709.5 Openings. Openings in a smoke barrier shall be protected in accordance with Section 714.

711 PENETRATIONS

711.1 Scope. The provisions of this section shall govern the materials and methods of construction used to protect through-penetrations and membrane penetrations.

711.1.1 Construction documents. Construction documents shall indicate how penetrations created by electrical, plumbing, environmental and communication conduits, pipes and systems are to be protected when such items penetrate fire resistance rated assemblies.

711.2 Installation details. Where sleeves are used, the sleeves 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. 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.

711.3.1 Through-penetrations. Through-penetrations of fire resistance rated walls shall comply with 711.3.1.1 or 711.3.1.2.

Exceptions: Where the penetrating items are steel, ferrous or copper pipes or steel conduits, the annular space between the penetrating item and the fire resistance rated wall shall be permitted to be protected as follows:

1. In concrete or masonry walls where the penetrating item is a maximum 6" nominal diameter and the opening is a maximum 144 square inches, concrete, grout or mortar shall be permitted where 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 E 119 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.

711.3.1.1 Fire resistance rated assembly: Penetrations shall be installed as tested in the approved fire resistance rated assembly.

711.3.1.2 Through-penetration firestop system. Through-penetrations shall be protected by an approved penetration firestop system installed as tested in accordance with ASTME 814, with a minimum positive pressure differential of 0.01 inch of water and shall have an F rating of not less than the required fire resistance rating of the wall penetrated.

711.3.2 Membrane Penetrations. Membrane penetrations shall comply with Section 711.3.1. Where walls and partitions are required to have a minimum 1 hour fire resistance rating, recessed fixtures shall be so installed such that the required fire resistance will not be reduced.

Exceptions:

1. Steel electrical boxes that do not exceed 16 square inches in area provided the total area of such openings does not exceed 100 square inches for any 100 square feet of wall area. Outlet boxes on opposite sides of the wall shall be separated by a horizontal distance of not less than 24 inches, or be separated by solid fire blocking in accordance with Section 716.2.1 or other listed materials and methods. Membrane penetrations for listed electrical outlet boxes of any material are permitted provided such boxes have been tested for use in fire resistance rated assemblies and are installed in accordance with the instructions included in the listing and labeling.
2. The annular space created by the penetration of a fire sprinkler provided it is covered by a metal escutcheon plate.

711.4 Horizontal assemblies. Penetrations 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 707 or shall comply with Sections 711.4.1 through 711.4.4.

711.4.1 Through-penetrations. Through-penetrations of fire resistance rated horizontal assemblies shall comply with 711.4.1.1 or 711.4.1.2.

711.4.1.2 Through-penetration firestop system. Through-penetrations shall be protected by an approved through-penetration firestop system installed as tested in accordance with ASTM E 814, with a minimum positive pressure differential of 0.01 inch of water. The system shall have an F rating and a T rating of not less than 1 hour but not less than the required rating of the floor penetrated.

Exception: Floor penetrations contained and located within the cavity of a wall do not require a T rating.

711.4.2 Membrane penetrations. Penetrations of membranes that are part of a fire resistance rated horizontal assembly shall comply with Section 711.4.1.1 or 711.4.1.2. Where floor/ceiling assemblies are required to have a minimum 1 hour fire resistance rating, recessed fixtures shall be so installed such that the required fire resistance will not be reduced.

711.4.3.1 Noncombustible penetrating items. Noncombustible penetrating items that connect not more than three stories are permitted provided that the annular space is filled with an approved noncombustible material to resist the free passage of flame and the products of combustion.

711.4.3.2 Penetrating items. Penetrating items that connect not more than two stories are permitted provided that the annular space is filled with an approved material to resist the free passage of flame and the products of combustion.

712 FIRE RESISTANT JOINT SYSTEMS

712.1 General. 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 it is installed. Fire resistant joint systems shall be tested in accordance with Section 712.3. The void created at the intersection of a floor/ceiling assembly and an exterior curtain wall assembly shall be protected in accordance with Section 712.4.

712.1.1 Construction documents. Construction documents shall indicate how joints are to be protected when such items penetrate fire resistance rated assemblies.

712.3 Fire test criteria. Fire resistant joint systems shall be tested in accordance with the requirements of UL 2079 under the following condition.

1. Nonsymmetrical wall joint systems shall be tested with both faces exposed to the furnace, and the assigned fire resistance rating shall be the shortest duration obtained from the two tests. When evidence is furnished to show that the wall was tested with the least fire resistant side exposed to the furnace, subject to acceptance of the building official, the wall need not be subjected to tests from the opposite side.

712.4 Exterior curtain wall/floor intersection. 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 material. Such material shall be securely installed and capable of preventing the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E 119 time-temperature fire conditions under a minimum positive pressure differential of 0.01 inch of water column (2.5 Pa) for the time period at least equal to the fire resistance rating of the floor assembly.

714 OPENING PROTECTIVES

714.1 General. Opening protectives required by other sections of this code shall comply with the provisions of this section.

714.2 Fire door and shutter assemblies. Approved fire door and fire shutter assemblies shall be constructed of any material or assembly of component materials that conforms to the test requirements of NFPA 252 and the fire protection rating indicated in Table 714.2. Fire door assemblies and shutters shall be installed in accordance with the provisions of this section and NFPA 80.

Exception: Labeled protective assemblies that conform to the requirements of this section or UL 10A, 14B, and 14C for tin-clad fire door assemblies.