

**EXCERPTS FROM
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 fire-resistance 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 fire-resistance 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 m²) and the penetration is protected with concrete, grout or mortar for the full thickness of the assembly or the thickness required to provide a fire-resistance rating equivalent to the fire-resistance 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 fire-resistance 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 m²) 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 mm²) 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 fire-resistance rated assemblies and installed in accordance with the tested assembly.

714.2 fire-resistance 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 fire-resistance 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 fire-resistance 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 fire-resistance 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 m²) and the penetration is protected with concrete, grout or mortar for the full thickness of the assembly or the thickness required to provide a fire-resistance rating equivalent to the fire-resistance 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 fire-resistance rating of not less than 1 hour.