

## Residential Code: Rated walls in townhomes and protected duplexes.

### Definitions:

- Duplex: An attached two- family dwelling unit. Units shall be separated by wall and floor assemblies not less than 1 hour fire rating.
- Townhomes: A single-family dwelling unit constructed in a group of two or more attached units separated by property lines or assumed property lines based on the location of the double wall or common wall in which each unit extends from foundation to roof and with yard or public way on not less than two sides.. Each townhouse shall be separated by a 2 hour fire rated wall (1 hour on each side) unless sprinkled then reduces to 1 hour.

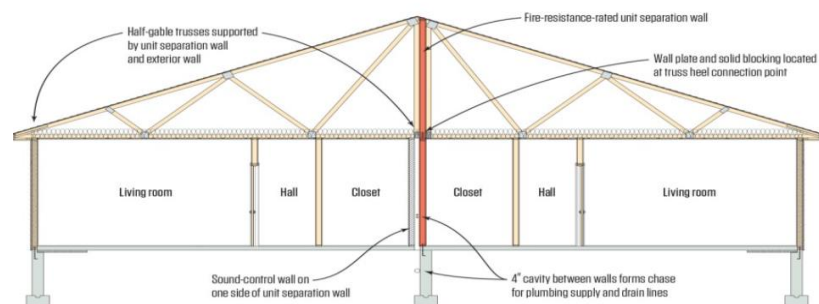
*R302.2 Townhouses. Each townhouse shall be considered a separate building and shall be separated by fire-resistance rated wall assemblies meeting the requirements of Section R302.1 for exterior walls. R302.2.1 or R302.2.2.*

*Exception: If an automatic residential fire sprinkler is installed, a common 1-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119 or UL263 is permitted for townhouses if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. The wall shall be rated for fire exposure from both sides and shall extend to and be tight against exterior wall sheathing and the underside of the roof sheathing. Electrical installations shall be installed in accordance with Section R302.4.*

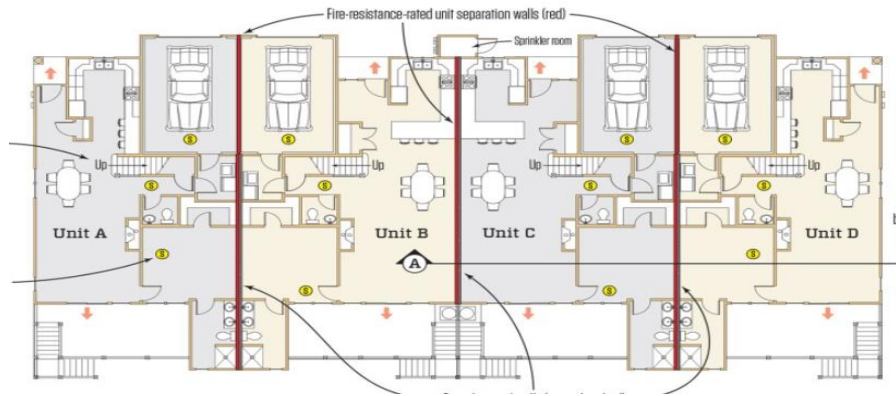
**R302.2.1 Double walls.** Each townhouse shall be separated by two 1-hour fire resistance-rated wall assemblies tested in accordance with ASTM E119, UL263 or Section 703.3 of the 2018 NC Building Code.

**R302.2.2 Common Walls.** Common walls separating townhouses shall be assigned a fire-resistance rating in accordance with Item #1 or 2. The common wall shared by two townhouses shall be constructed without plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. The wall shall be rated for fire exposure from both sides and shall extend to and be tight against exterior walls and the underside of the roof sheathing. Electrical installations shall be in accordance with Chapters 34 through 43. Penetrations of the membrane of common walls for electrical outlet boxes shall be in accordance with Section R302. 4.

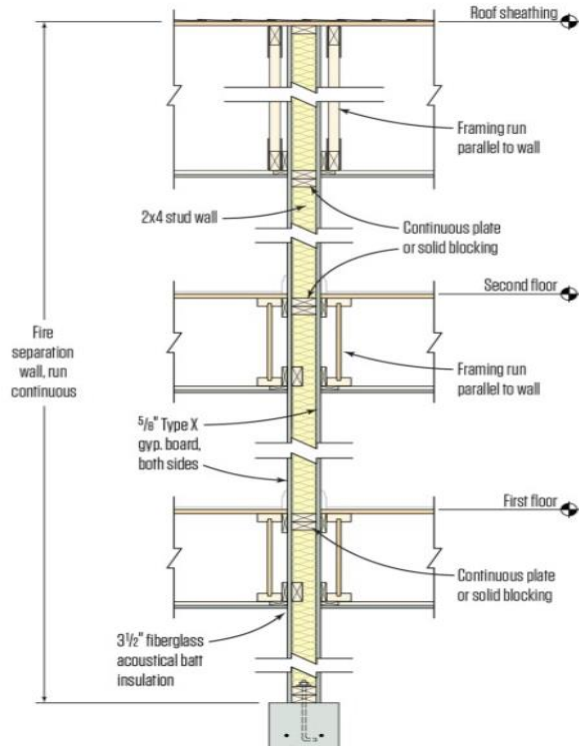
### Duplex:



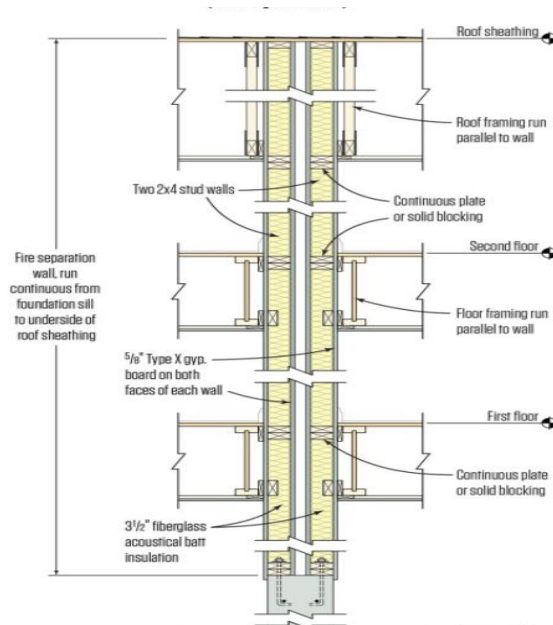
Townhome:



Typical example of 1 hour rated wall:

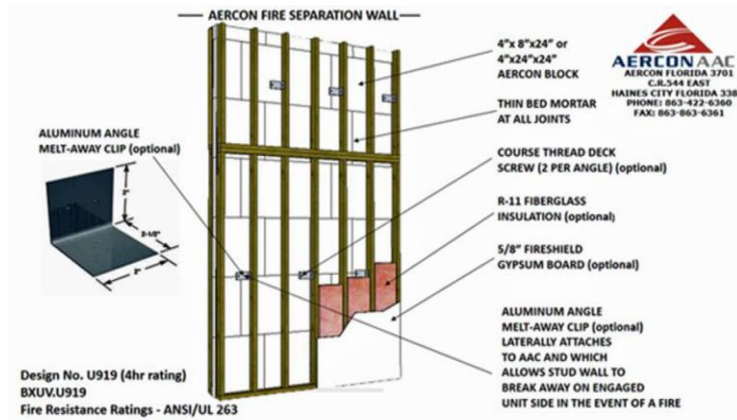


Typical example of 2 hour rated wall:



There are many different ways a designer can obtain the rated separation, which gets reviewed by plan review.

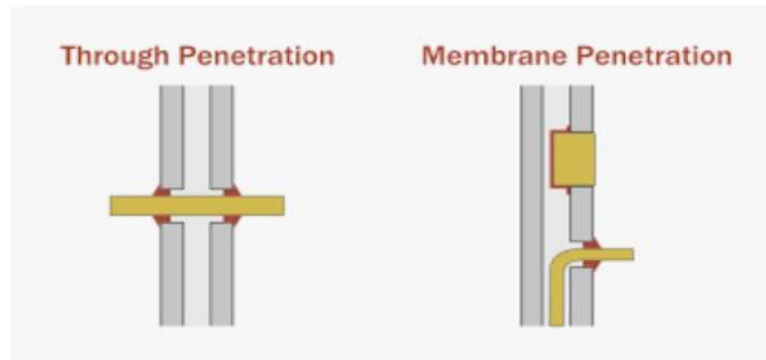
Example of a CMU rated wall:



## Penetrations

### Definitions:

- **Membrane penetration:** A penetration that has an opening that only passes through one side of the fire rated assembly.
- **Through penetration:** A penetration that has an opening that passes entirely through a fire-resistance rated assembly.



#### R302.4.2 Membrane penetrations.

Membrane penetrations shall comply with Section R302.4.1. Where walls are required to have a fire-resistance rating, recessed fixtures shall be installed so that the required fire-resistance rating will not be reduced.

#### Exceptions:

1. Membrane penetrations of not more than 2-hour fire-resistance-rated walls and partitions by steel electrical boxes that do not exceed 16 square inches (0.0103 m<sup>2</sup>) in area provided that the aggregate area of the openings through the membrane does not exceed 100 square inches (0.0645 m<sup>2</sup>) in any 100 square feet (9.29 m<sup>2</sup>) of wall area. The annular space between the wall membrane and the box shall not exceed 1/8 inch (3.1 mm). Such boxes on opposite sides of the wall shall be separated by one of the following:
  - 1.1. By a horizontal distance of not less than 24 inches (610 mm) where the wall or partition is constructed with individual noncommunicating stud cavities.
  - 1.2. By a horizontal distance of not less than the depth of the wall cavity where the wall cavity is filled with cellulose loose-fill, rockwool or slag mineral wool insulation.
  - 1.3. By solid fireblocking in accordance with Section R302.11.
  - 1.4. By protecting both boxes with *listed* putty pads.
  - 1.5. By other *listed* materials and methods.
2. Membrane penetrations by *listed* electrical boxes of any materials provided that the boxes have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the *listing*. The annular space between the wall membrane and the box shall not exceed 1/8 inch (3.1 mm) unless *listed* otherwise. Such boxes on opposite sides of the wall shall be separated by one of the following:
  - 2.1. By the horizontal distance specified in the *listing* of the electrical boxes.
  - 2.2. By solid fireblocking in accordance with Section R302.11.
  - 2.3. By protecting both boxes with *listed* putty pads.
  - 2.4. By other *listed* materials and methods.
3. The annular space created by the penetration of a fire sprinkler provided that it is covered by a metal escutcheon plate.

**R302.4 Dwelling unit rated penetrations.**

Penetrations of wall or floor-ceiling assemblies required to be fire-resistance rated in accordance with Section R302.2 or R302.3 shall be protected in accordance with this section.

**R302.4.1 Through penetrations.**

Through penetrations of fire-resistance-rated wall or floor assemblies shall comply with Section R302.4.1.1 or R302.4.1.2.

**Exception:** Where the penetrating items are steel, ferrous or copper pipes, tubes or conduits, the annular space shall be protected as follows:

1. In concrete or masonry wall or floor assemblies, concrete, grout or mortar shall be permitted where installed to the full thickness of the wall or floor assembly or the thickness required to maintain the fire-resistance rating, provided that both of the following are complied with:
  - 1.1. The nominal diameter of the penetrating item is not more than 6 inches (152 mm).
  - 1.2. The area of the opening through the wall does not exceed 144 square inches (92 900 mm<sup>2</sup>).
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 positive pressure differential of not less than 0.01 inch of water (3 Pa) at the location of the penetration for the time period equivalent to the fire-resistance rating of the construction penetrated.

**R302.4.1.1 Fire-resistance-rated assembly.**

Penetrations shall be installed as tested in the *approved* fire-resistance-rated assembly.

**R302.4.1.2 Penetration firestop system.**

Penetrations shall be protected by an *approved* penetration firestop system installed as tested in accordance with ASTM E814 or UL 1479, with a positive pressure differential of not less than 0.01 inch of water (3 Pa) and shall have an F rating of not less than the required fire-resistance rating of the wall or floor-ceiling assembly penetrated.