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City of Kansas City, Missouri

City Planning and Development

CPD-DS Multifamily Dwelling Projects and Fire Wall Construction Under the IRC and IBC

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Multifamily residential buildings may take on many different sizes and shapes. The 2012 International Residential Code (IRC) and the 2012 International Building Code (IBC) have been adopted by reference in the Kansas City Building and Rehabilitation Code (KCBRC). Multifamily residential buildings may fall under the jurisdiction of either code depending on the specifics of the project. This document is intended to assist you in determining which provisions apply to your project. It will also provide guidance for the construction of fire walls under the IBC and dwelling unit and townhouse separation walls under the IRC. It is not intended that this document be used without an understanding of the building code and building code concepts. Please consult the adopted codes and the KCBRC for complete details. If you have questions, you may call the CPD-DS Code Question Line at (816) 513-1511.

APPLICABLE CODE

Q: Does the structure contain only one or two dwelling units?

If the answer is yes, then the IRC is the applicable code [KCBRC 18-2(c)(1), Exception (a)]. A structure containing only two dwelling units may be constructed as a "two-family dwelling" (i.e. a duplex) per the provisions of IRC R302.3 only if the parcel is not divided between the units, now or in the future. If the parcel is to be divided between units, then the building shall be constructed as a townhouse. KCBRC 18-57 R202 expands the definition of a townhouse as follows:

> **TOWNHOUSE.** An attached single-family dwelling unit, in which each unit extends from foundation to roof and with open space on at least two sides, constructed:
> In a group of three or more attached units; or,
> In a group of two units where a property line exists between the units on the underlying parcels.

Q: Does the structure contain only three or more dwelling units?

If the answer is yes, then the project may be designed under the IBC (as a group R-2 occupancy) or, if meeting the definition of a townhouse, under the IRC. See KCBRC definition of townhouse above. The use of the IBC versus the IRC for projects meeting the definition of a townhouse is at the designer's option, except where the underlying parcel is being divided to create a property line between units, in which case the IRC shall apply. If the townhouse units are designed as group R-3 occupancies, then the IRC is the applicable code. [KCBRC 18-2(c)(1), Exception (a); IRC R317.2; IBC 310]

Q: Does a building contain a multi-use project, i.e. does it contain other uses such as business, mercantile, assembly, etc in addition to dwelling units?

If the answer is yes, then the IBC is the applicable code. Buildings containing multiple occupancy groups shall comply with IBC 508.1. Note that both 'nonseparated use' and 'separated use' design options are available. Private garages are classified as a group U occupancy; separation shall comply with IBC 508.2.

IRC PROJECT QUESTIONS

Q: What separation is required between dwelling units in a duplex (two-family dwelling) under the IRC?

A one-hour fire-resistive separation is required between units in a duplex. The separation may be vertical and/or horizontal. All construction supporting a horizontal one-hour separation shall also have a one-hour fire-resistive rating. Penetrations of the dwelling unit separation shall be protected as required by IRC Section 302.4. The required separation shall extend tight against exterior walls and, if vertical, to the underside of the roof sheathing. The required separation may be reduced to a 30-minute fire-resistance rating in buildings provided throughout with an automatic sprinkler system in accordance with NFPA 13. [IRC R302.3]

As an exception, in lieu of extending the separation wall through the attic, the entire ceiling may be protected with 5/8" Type X gypsum board and a draftstop separating the units installed in the attic per IRC R302.3. All framing supporting the ceiling assembly shall be protected by ½" gypsum board.

(Note that if the underlying parcel is divided to create a property line between units, the building is no longer a two-family dwelling, rather it is a townhouse. The building shall be constructed as a townhouse with separation in accordance with IRC R302.2.)

Q: What separation is required between townhouse units under the IRC?

Each townhouse unit shall be considered to be a separate building [IRC R302.2]. The "fire separation distance" for all sides of each unit shall be determined [R202]. The fire separation distance is the distance from the face of a townhouse unit to a property line, or to an imaginary line between two units. The location of the line used to determine the fire separation distance shall be shown on the plans (whether a current property line, a proposed property line, or an imaginary line). The line shall be extended to fully separate the townhouse units, not just where the units share a common wall.

The walls separating townhouse units shall be constructed in accordance with KCBRC/IRC R302.2 based on the fire separation distance. Any exterior wall with a fire separation distance of less than 5 feet shall be of one-hour fire-rated construction. No wall openings (such as windows or doors) are permitted when the fire separation distance is less than 3 feet, and openings are limited to 25% of the wall area when the fire separation distance is at least 3 feet but less than 5 feet. Projections (such as eaves) shall be protected on the underside when the fire separation is less than 5 feet, and are prohibited when the fire separation distance is less than 2 feet.

The common portion of the required separation wall may be constructed as two back-to-back one-hour walls, or a common one-hour wall may be constructed [IRC R302.2, Exception]. The wall (or walls) shall be continuous from the foundation to the roof without offsets (including under cantilevered floors), and shall extend within all building projections, such as eave overhangs [IRC R302.2.1]. If a common one-hour fire-resistive wall is used, then no plumbing or mechanical equipment, ducts or vents shall be installed within the wall [IRC R302.2]. Electrical conduits and boxes may be installed in this wall within the limitations of IRC R302.2.

A parapet shall be provided as an extension of the common portion of the fire-resistance-rated wall or walls to a height of 30" above the roofline. The parapet may be deleted if: the roof sheathing is of noncombustible materials or fire-retardant treated lumber, or if a layer of 5/8" Type X gypsum board is installed directly under combustible sheathing supported by a minimum of nominal 2" ledgers attached to the sides of the roof framing members, for a distance of 4'on each side of the wall,; and Class C roof covering is used. As solid sheathing or solid sheathing plus gypsum board is required, no openings in the roof are permitted within 4 feet of the wall. If the roof surfaces adjacent to the fire-resistance-rated wall(s) are at an elevation difference in excess of 30", then the common wall between the roof elevations shall be of one-hour fire-resistive construction. [IRC R302.2.2].

The required fire separation wall shall also be extended to separate any attached accessory structures (e.g. decks, decks with roofs or shade structures, etc.) where those structures contain any enclosed or concealed spaces. Where the attached accessory structure contains any enclosed or concealed spaces, the separation shall extend through the entire accessory structure, not just within the enclosed or concealed spaces.

Q: What separation is required between the dwelling unit and an attached private garage under the IRC?

The attached garage shall be separated from the dwelling unit by not less than ½" gypsum board applied to the garage side. If there is habitable space above the garage, the garage shall be separated from that space by 5/8" Type X gypsum board. Where the separation is a floor-ceiling assembly, the structure supporting the separation shall also be protected by not less than ½" gypsum board. Doors between the dwelling unit and the garage shall be 1-3/8" solid wood, 1-3/8" solid or honeycomb steel doors, or 20-minute fire-rated doors. Ducts in the garage or penetrating the garage separation shall be of No. 26 gage sheet steel; a one-hour rated fire damper shall be provided if the duct opens into the garage [IRC R302.5.2, CPD-DS Interpretation CI2009-014]. There shall be no openings between the garage and a sleeping room. [IRC R302]

Q: Is an automatic fire sprinkler system required under the IRC?

No.

Q: Are there restrictions regarding the arrangement of utility services under the IRC?

Water and Sewer Service – KCMO Water Services Department and CPD Land Development regulations require separate water and sewer services for each townhouse unit.

Gas Service - IRC Section G2415.1 prohibits gas piping downstream from the point of delivery from extending through any townhouse unit other than the unit served by the piping. IRC G2420.3 requires a shutoff valve installed outdoors at each building (townhouse unit).

Electric Service - IRC E3601.3 prohibits service conductors serving one building (townhouse unit) passing through the interior of another unit. However, the IRC does not prohibit feeder conductors (i.e. downstream of service disconnect) from passing through other units.

IBC PROJECT QUESTIONS

Q: For a multifamily residential project under the IBC, what separation is required between units?

All dwelling units shall be separated from one another by one-hour fire-resistive construction [IBC 420, 708.1, 711.3]. This will be in the form of a 'fire partition' [IBC 708] if vertical or by a rated 'horizontal assembly' [IBC 711] if horizontal. The assembly ratings may be reduced to ½-hour if the building is of construction type IIB, IIIB or VB and is protected throughout by an automatic sprinkler system installed per NFPA 13 (systems installed per NFPA 13R are not eligible for this reduction).

Fire partitions shall extend continuously from the top of the floor assembly below to the underside of the floor or roof deck above, or the underside of the ceiling of a fire-rated floor/ceiling or roof/ceiling above. If not continuous through an assembly above that is of combustible construction, a draftstop shall be provided in line with the fire partitions [see IBC 708.4 for exceptions]. All construction supporting the dwelling unit separation assembly, whether vertical or horizontal, shall be of the same required fire-resistance rating. [IBC 708.4, 711.4]

Q: What is the difference between a 'fire wall' and a 'party wall'?

A fire wall is a wall constructed such that the structure on each side of the wall may be considered a separate building for the purposes of building code evaluation. A party wall is a fire wall that is located on a property line on the underlying parcel(s). Note that a party wall is required in any condition where a property line on the underlying parcel(s) is located under and within the footprint of a building above. [IBC 706].

Q: How do I build a 'fire wall' or a 'party wall' under the IBC?

Each of the following items shall be addressed in the design and construction of a fire wall:

1. Determine the required fire-resistive rating of the wall, based on the occupancy group(s) and construction type(s) involved. [IBC 706.4]

2. Verify that the buildings on each side are structurally independent (e.g no beams or joists may span through the fire wall). [IBC 706.2]

3. Verify that the wall is continuous from foundation to roof, including beneath cantilevered floors. No horizontal offsets permitted. [IBC 706.1, 706.6]

4. Verify that the fire wall extends 18" horizontally beyond the furthermost exterior surface of the exterior wall. [IBC 706.5]

   Exceptions:

   a. A fire wall may terminate at the interior surface of combustible exterior sheathing or siding if the exterior wall is one-hour fire-resistance rated for 4' on each side of the fire wall. Openings in this area require ¾ hour rating.

   b. A fire wall may terminate at the interior surface of noncombustible exterior sheathing or siding if the noncombustible sheathing or siding is extended without openings for 4' on each side of the fire wall. If openings are desired in this area, they shall also be of fixed, noncombustible construction (e.g. a fixed pane with metal frame), or ¾ hour opening protection shall be provided.

   c. A fire wall may terminate at the interior surface of noncombustible exterior sheathing if the building on both sides of the wall is fully sprinkled.

5. Verify that the fire wall extends (continuously from foundation to roof) to the outer edge of any horizontal projecting elements (e.g. balconies, roof eaves, etc. – see #3 above for cantilevered floors) that are within 4' of the fire wall. [IBC 706.5.2]

   Exceptions: The fire wall need not extend beyond the point required in item #4 above provided that the exterior wall behind and below the projections is one-hour rated with ¾-hour protected openings for a width on each side of the fire wall equal to the depth of the projection. In addition, if there are concealed spaces within the projection, the fire wall shall be extended through the concealed space (if the projection is wholly noncombustible, the extension of the fire wall may be reduced to one-hour construction).

6. Verify if there are any exterior wall intersections at fire walls that form an angle of less than 180 degrees. If so, the exterior wall for 4' on each side of the fire wall shall be of one-hour construction. [IBC 706.5.1]

7. Verify if any exterior walls, that are on opposite sides of the fire wall, are facing each other or are oriented at less than a 90 degree angle to one another (e.g. at a court). If so, an imaginary (property) line shall be placed between the walls, and the fire separation distance [IBC 202]

between each exterior wall and the imaginary line shall be determined; opening protection and exterior wall protection shall be provided accordingly. [IBC 705.3, 705.5] For buildings separated by fire walls, only the exterior wall and opening protection requirements of IBC Section 705 apply to walls of the adjacent buildings [per discussion with Mike Pfeiffer of ICC on 1/26/05].

Q: Is an automatic fire sprinkler system required under the IBC?

Yes. An automatic fire sprinkler system is required throughout all buildings containing a residential use. [IBC 903.2.8]

APPLICATION PROCEDURE

Q: Can 'master plans' be used for other than one and two family projects? ('Master plans' are building plans that are pre-approved such that they may be used for construction on multiple sites.)

Yes. For townhouse buildings (occupancy group R-3) only, the master plan concept may be used even if there are more than two dwelling units per structure. Note that no additional permits may be obtained on an existing master plan after the adoption of a new model code or code package.

Q: Can the one & two family review process be used for anything other than a detached one and two family project?

No. All other projects will be logged in as a commercial project, regardless whether under the IBC or IRC.

Q: Can the CPD-DS-Authorized One and Two Family 3rd-Party Inspectors be utilized for anything other than a one and two family dwelling?

Yes. In addition to one and two family dwellings, townhouse projects (occupancy group R-3) constructed under the conventional construction provisions of the IRC may use a CPD-DS-Authorized 3rd-Party Residential Inspector. See Information Bulletin 102 for further details. See CPD-DS's website for a current list of CPD-DS-authorized inspectors.

Q: How do I demonstrate on the construction documents that construction will be fire-resistance rated?

A fire-resistive construction assembly shall be shown on the permit drawings for all required fire-resistive assemblies (including walls, floor/ceilings, firestopping systems, etc.). The reference number from a recognized source (such as the IBC chapter 7, the UL Fire-Resistance Directory, etc.) shall be provided, along with complete construction details as required by the listing.

Q: Are complete plans, including mechanical, electrical and plumbing (MEP) drawings, required for IRC townhouse buildings?

Complete plans are required, except that plans are not required for conventional MEP installations that are within and serving only a single dwelling unit. The arrangement of all utility services (water, sewer, gas and electric service, etc.) shall be indicated on the plans. Detailed plans shall be provided for any construction shared among the units, and for any electric service 400 amps or greater, or services including a generator, transformer, etc. (see Information Bulletin 160) for further details regarding electric service submittals). All construction shall be in accordance with the IRC.

Q: For multi-family construction, is the applicant required to indicate whether the property will be lot split, platted or otherwise constructed for separate ownership creating property lines on the underlying parcels between proposed dwelling units?

Yes.