

International Property Maintenance Code

Rental Property Review Checklist Reference Guide

702

❖ Means of egress in existing buildings is regulated by the IFC. The IFC contains provisions for number of exits, egress width, stairs, guards, handrails, corridors, dead ends, obstructed exits, exit signs and other requirements for evaluating the means of egress in existing buildings. Aisles, locked doors and emergency escape openings are life safety features that are frequently affected by routine operations in existing buildings, and can be inspected by property maintenance inspectors in the course of a typical inspection. These topics, therefore, are included in the subsections of Section 702 of the IPMC.

702.1 General. A safe, continuous and unobstructed path of travel shall be provided from any point in a building or structure to the public way. Means of egress shall comply with the *International Fire Code*.

❖ Even a slight delay in a fire situation can mean the difference between life and death. Dangerous levels of smoke can develop in a deceptively quick manner at the early stages of a fire, and obstruction to means of egress or insufficient means of egress very often leads to tragedy in a fire. This section prohibits obstruction of corridors, hallways and stairs by miscellaneous storage that could delay egress. It also prohibits dead-end corridors or passageways that could cause confusion or require occupants to retrace their steps to find a way out of the building. Specific requirements for means of egress such as permissible length of dead-end corridors or required means of egress width, are found in the IFC.

702.2 Aisles. The required width of aisles in accordance with the *International Fire Code* shall be unobstructed.

❖ Assembly occupancies that contain seats, tables, displays and similar furnishings or equipment present a unique challenge for efficient and orderly exiting in an emergency situation. For this reason, the IFC contains detailed requirements for the configuration, width and availability of aisles in these occupancies. This section requires that aisles be unobstructed so that they will serve their intended (and required) function.

702.3 Locked doors. All means of egress doors shall be readily openable from the side from which egress is to be made without the need for keys, special knowledge or effort, except where the door hardware conforms to that permitted by the *International Building Code*.

❖ One of the fundamental principles of means of egress in both new and existing buildings is that doors must be readily operable from the “egress side” (the side occupants approach in order to exit the building). Locks that require key operation from the inside are prohibited except in very limited circumstances involving security at main entrance doors for certain occupancies as prescribed in the *International Building Code*® (IBC®). Locks that are operated from the interior, such as thumb turns or flush bolts, are typically prohibited since they require special knowledge or effort, although this is subject to the judgement of the code official in existing buildings. Doors that are locked from the exterior of the building but are released by the unlatching mechanism from the interior, such as panic hardware and security hardware involving doorknobs or lever mechanisms, are the preferred alternative if security is needed.

702.4 Emergency escape openings. Required emergency escape openings shall be maintained in accordance with the code in effect at the time of construction, and the following. Required emergency escape and rescue openings shall be operational from the inside of the room without the use of keys or tools. Bars, grilles, grates or similar devices are permitted to be placed over emergency escape and rescue openings provided the minimum net clear opening size complies with the code that was in effect at the time of construction and such devices shall be releasable or removable from the inside without the use of a key, tool or force greater than that which is required for normal operation of the escape and rescue opening.

❖ This section of the code takes into account that many changes have occurred over the years in the many editions of the construction codes. The provisions for emergency escape and rescue openings are only subject to the code that is in effect at the time of construction, rather than expecting all structures to retroactively meet the requirements of each new code.

“Required emergency escape openings” refers to the escape windows and doors that are required for sleeping rooms and basements in new construction. In the IBC, emergency escape openings are required from all basements as well as all sleeping rooms; however, codes for new construction prior to the development of the IBC did not require emergency escape windows in basements without sleeping rooms.

The intent of this section is that emergency escape openings that were required at the time of a building’s construction be maintained unobstructed. It prohibits the installation of security devices on these required openings

unless the windows or doors provide a net clear opening of at least that which is required for new construction in accordance with the IBC. If installed, these devices must be removable (or moveable to provide the required net clear opening space) in a manner that facilitates the quick use of the window in an emergency situation; therefore, security devices that require the unscrewing of screws or bolts, prying with a bar or unlocking with a key in order to be removed or moved are not permitted on these openings. In addition, they must not require excessive force for their removal, since they may need to be operated by children or the elderly

704.2 Smoke alarms. Single or multiple-station smoke alarms shall be installed and maintained in Groups R-2, R-3, R-4 and in dwellings not regulated in Group R occupancies, regardless of occupant load at all of the following locations:

1. On the ceiling or wall outside of each separate sleeping area in the immediate vicinity of bedrooms.
2. In each room used for sleeping purposes.
3. In each story within a dwelling unit, including basements and cellars but not including crawl spaces and uninhabitable attics. In dwellings or dwelling units with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

Single or multiple-station smoke alarms shall be installed in other groups in accordance with the *International Fire Code*.

❖ The greatest danger associated with dwelling units and sleeping rooms is the fact that occupants may be asleep and unaware of a fire developing in the room or egress path. Single- or multiple-station smoke alarms must be provided in the sleeping room and any intervening room or space between the sleeping room and the exit access door from the room to increase the likelihood of a fire being detected, therefore improving the ability of sleeping occupants to respond. If the dwelling unit or suite involves more than one level, a smoke alarm must also be provided on every separate level. Smoke alarms are required in split-level arrangements, except those that meet the conditions described in Item 3. All smoke alarms within a guestroom or suite must be interconnected so that actuation of one alarm will actuate all smoke alarms within the guestroom or suite.

304.3 Premises identification. Buildings shall have approved address numbers placed in a position to be plainly legible and visible from the street or road fronting the property. These numbers shall contrast with their background. Address numbers shall be Arabic numerals or alphabet letters. Numbers shall be a minimum of 4 inches (102 mm) high with a minimum stroke width of 0.5 inch (12.7 mm).

❖ Buildings that have been assigned a street number must have the number visibly displayed in Arabic figures (i.e., 1, 2, 3, etc.) or spelled out in alphabet letters at least 4 inches (102 mm) in height and each stroke must be 1/2-inch wide (12.7 mm) (see Figure 304.3). Easily legible numbers are essential for rapid response of emergency personnel.

304.10 Stairways, decks, porches and balconies. Every exterior stairway, deck, porch and balcony, and all appurtenances attached thereto, shall be maintained structurally sound, in good repair, with proper anchorage and capable of supporting the imposed loads.

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Regular maintenance is required to keep stairs, decks, porches and balconies in good repair so they do not become a hazard to occupants or visitors. Positive anchorage of elevated decks and exterior stairs that may be subject to collapse is especially important. The IBC shall be consulted for required live loads that these elements are typically required to support.

304.12 Handrails and guards. Every handrail and guard shall be firmly fastened and capable of supporting normally imposed loads and shall be maintained in good condition.

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604.2 Service. The size and usage of appliances and equipment shall serve as a basis for determining the need for additional facilities in accordance with the ICC *Electrical Code*. Dwelling units shall be served by a three-wire, 120/240 volt, singlephase electrical service having a rating of not less than 60 amperes.

❖ This section prescribes the minimum size of the electrical service that must be provided for all structures. The electrical service consists of the service entrance conductors, metering devices, service grounding means, main disconnect, main overcurrent device and typically the distribution panelboard and all overcurrent devices. The size of the service is dependent upon the size of the load (demand). The total electrical usage or load must be determined as prescribed in the *International Code Council Electrical Code Administrative Provisions* or the *International Residential Code®* (IRC®). Chapter 35 of the IRC provides user-friendly guidance on sizing of services.

If the actual load exceeds the capacity of the service, additional capacity must be provided. In no case is the service for a dwelling unit permitted to be less than 60 amperes. Additionally, all dwelling unit services are to be 120/240 volt (three wire). The electrical usage in a typical dwelling unit today requires a service of at least a 60-ampere capacity to meet the occupants' needs. The requirement for a three-wire (120/240 volt) service is intended to allow the use of 240-volt appliances, such as clothes dryers, air conditioners and ranges. Additionally, appliances that operate at 240 volts consume less current, thereby conserving the remaining capacity of the service.

Overloading or constant loading to capacity subjects the service to excessive heating and component stress. Not only does this invite failure, but it also increases the risk of fire and creates the inconveniences of a nuisance circuit breaker tripping or fuse blowing. Nuisance fuse blowing, in turn, encourages the dangerous practice of replacing blown fuses with fuses of larger size. Overfusing is one of the largest potential causes of fire in any electrical system.

An inadequately sized service could also restrict the occupants' use of appliances by imposing nonsimultaneous use to avoid overloading the service.

A service determined to be undersized in accordance with this section and the requirements of NFPA 70 or the IRC must be enlarged as necessary.

604.3 Electrical system hazards. Where it is found that the electrical system in a structure constitutes a hazard to the occupants or the structure by reason of inadequate service, improper fusing, insufficient receptacle and lighting outlets, improper wiring or installation, deterioration or damage, or for similar reasons, the code official shall require the defects to be corrected to eliminate the hazard.

❖ Any electrical system deficiency or condition that is deemed hazardous to the occupants or to the structure must be abated to eliminate the hazard. Electrical system hazards include, but are not limited to, the following:

- Inadequate (undersized) service;
- Improper fusing and overcurrent protection;
- Insufficient receptacle distribution;
- Lack of sufficient lighting fixtures;
- Deteriorated, damaged, worn or otherwise defective wiring, equipment and appliances;
- Improperly installed or protected wiring methods;
- Lack of proper service or equipment grounding;
- Open splices in wiring;
- Inadequately supported devices, wiring or equipment;
- Any exposed conductors or components constituting a shock hazard;
- Missing or damaged device cover plates;
- Excessive use of extension cords;
- Overloaded receptacles or circuitry; and
- Lack of ground fault circuit interrupter (GFCI) protection.

The most commonly encountered hazard is improper overcurrent protection of conductors. Fuses and circuit breakers are devices designed to limit current flow to the maximum safe current-carrying capacity (ampacity) of a conductor. With rare exception the conductor's current-carrying capacity (ampacity) must be greater than or at least equal to the ampere rating of the overcurrent device that supplies it. If a fuse or circuit breaker has a larger ampere-rating capacity than the conductor it is intended to protect, the device will permit the conductor to carry currents in excess of its capacity. The resultant overload will cause conductor heating, insulation deterioration and, possibly, a fire. The typical scenario is the occupant who thinks he or she has "cured" a fuse-blowing problem by substituting fuses that are larger in size. This appears to alleviate the problem for the occupant but, in actuality, an extreme fire hazard has been created by eliminating the circuit conductor overcurrent protection.

605.3 Luminaires. Every public hall, interior stairway, toilet room, kitchen, bathroom, laundry room, boiler room and furnace room shall contain at least one electric luminaire.

❖ Permanent lighting outlets must be provided to illuminate hallways, stairways, toilet rooms, bathrooms, laundry rooms, kitchens and furnace and boiler rooms. The activities in such spaces are not compatible with portable lighting such as floor or table lamps; therefore, permanent lighting outlets (fixtures/luminaires) are required. In all other spaces, it is assumed that the occupants will provide lamps or other portable fixtures to meet their artificial lighting needs when natural lighting does not exist. Adequate lighting is necessary for occupants to traverse stairs and corridors without undue hazard; to allow for the proper use of plumbing fixtures and appliances; and to allow for servicing of appliances.

Furnace and boiler rooms are defined terms in the IMC, and the term "furnace room" also applies to a room containing a water heater.

304.5 Foundation walls. All foundation walls shall be maintained plumb and free from open cracks and breaks and shall be kept in such condition so as to prevent the entry of rodents and other pests.

- ❖ The foundation must safely support the entire structure. Minor problems left uncorrected can become major. Major foundation problems can result in collapse of the structure.

Minor damage includes hairline cracks, loose and flaking mortar and surface deterioration of cement blocks and poured concrete walls. Major damage includes large horizontal and vertical step cracks, and large areas of missing foundation material (see Figure 304.5).

Three of the most frequent causes of foundation failure result from damage caused at the time of construction, soil problems (settling, sliding, heaving and expanding) and the effects of water. Water entering the foundation through cracks, holes or breaks can freeze and expand, causing damage to the foundation.

The code official should order replacement of structural elements when major damage has occurred and should order appropriate maintenance, such as tuckpointing, if the damage is only minor. All conditions that permit entry of rodents or other pests must be corrected.

304.7 Roofs and drainage. The roof and flashing shall be sound, tight and not have defects that admit rain. Roof drainage shall be adequate to prevent dampness or deterioration in the walls or interior portion of the structure. Roof drains, gutters and downspouts shall be maintained in good repair and free from obstructions. Roofwater shall not be discharged in a manner that creates a public nuisance.

- ❖ A secure, nonleaking roof is necessary to keep a building properly maintained. Even small leaks can cause thousands of dollars in damage to insulation, plaster, studs and joists. Roof leaks usually occur along valley areas, around plumbing vents, chimneys, dormers and other penetrations through the roof.

Water runoff should be diverted away from the structure to prevent damage to the foundation and other structural elements. Runoff must be diverted away from neighboring properties, public sidewalks, alleys and streets to prevent nuisance problems. Two problems that can result from improper water runoff are flooding of basements and standing water or ice buildup on sidewalks, alleys and streets. Drains, gutters and downspouts must be kept in working order so that water runoff is properly diverted.

305.2 Structural members. All structural members shall be maintained structurally sound, and be capable of supporting the imposed loads.

- ❖ Common construction and repair defects include: undersized structural members that, over time, sag, crack and even collapse; inadequately fastened structural members that loosen and separate from each other; poor-quality construction materials; improperly installed or oversized notches and holes in structural members and poorly installed structural members.

Water is one of the most destructive elements to structures. Water damage most frequently occurs from roof leaks; plumbing leaks in bathrooms and kitchens and water penetration into basements and crawl spaces. Unrepaired leaks can rot and decay structural members. The code official shall inspect the bottom of columns, the outside ends of beams and joists, flooring under bathrooms and kitchens and the underside of roofs for evidence of water penetration and damage

Deferred maintenance is a problem with all buildings. A structure begins to deteriorate the moment it is completed. Both outside and inside factors affect structures: water, sun and wind on the outside, as well as furniture, equipment and occupants on the inside. As equipment wears out or malfunctions, it needs to be repaired or replaced.

Overloading is not a frequently encountered problem, but can occur when a building changes use and when new, heavier equipment is added. For example, in a structure used for retail sales, the live load that the floors, stairs and balconies must carry may change when converted to a manufacturing use. Structural members must be able to bear the loads imposed upon them. Commercial and industrial buildings present special concerns for the code official. To provide some level of confidence that a structure will safely withstand the anticipated loads, the code official may want to require the owner to provide evidence of the load-bearing capacity of the structure, as determined by a registered architect or engineer.

This information may be useful every time a structure changes occupancy. The code official cannot be sure structural changes have not occurred since the previous calculations were prepared.

404.1 Privacy. Dwelling units, hotel units, housekeeping units, rooming units and dormitory units shall be arranged to provide privacy and be separate from other adjoining spaces.

- ❖ Privacy is a fundamental psychological need. Every person needs a space to relax, sleep and dress that is separate from public or common rooms. Walls, corridors and doors should be arranged to offer the occupants their own private space.

404.2 Minimum room widths. A habitable room, other than a kitchen, shall not be less than 7 feet (2134 mm) in any plan dimension. Kitchens shall have a clear passageway of not less than 3 feet (914 mm) between counterfronts and appliances or counterfronts and walls.

- ❖ To prevent the use of inadequately sized rooms for living space, the code establishes a minimum dimension of 7 feet (2134 mm) at the narrowest width of all habitable rooms, except kitchens. Narrow rooms do not allow for the installation of furniture without unduly obstructing passageways through the rooms. Kitchens require only 3 feet (914 mm) of clearance between countertops and appliances or countertops and walls. Kitchens are not expected to be

occupied for long periods of time, nor is it expected that kitchens will be occupied by a large number of persons at any one time.

404.3 Minimum ceiling heights. Habitable spaces, hallways, corridors, laundry areas, bathrooms, toilet rooms and habitable basement areas shall have a clear ceiling height of not less than 7 feet (2134 mm).

Exceptions:

1. In one- and two-family dwellings, beams or girders spaced not less than 4 feet (1219 mm) on center and projecting not more than 6 inches (152 mm) below the required ceiling height.
 2. Basement rooms in one- and two-family dwellings occupied exclusively for laundry, study or recreation purposes, having a ceiling height of not less than 6 feet 8 inches (2033 mm) with not less than 6 feet 4 inches (1932 mm) of clear height under beams, girders, ducts and similar obstructions.
 3. Rooms occupied exclusively for sleeping, study or similar purposes and having a sloped ceiling over all or part of the room, with a clear ceiling height of at least 7 feet (2134 mm) over not less than one-third of the required minimum floor area. In calculating the floor area of such rooms, only those portions of the floor area with a clear ceiling height of 5 feet (1524 mm) or more shall be included.
- ❖ Sufficient ceiling heights are necessary to provide an adequate volume of air for occupants in closed spaces and to provide for their psychological well-being. The height requirements are established by this section.
- To accommodate various conditions, the code establishes exceptions that permit a reduction in ceiling height within limited conditions. These exceptions include the following:
- Exception 1 makes provisions for beams and girders to extend into the required minimum height. This is consistent with the IBC and the *International Residential Code*® (IRC®) requirements, which allow this type of projection to accommodate structural members.
- Exception 2 is included to permit the use of existing basements with low headroom. It is anticipated that these rooms will be used only occasionally and will not adversely affect the occupants' health or safety.
- Exception 3 is included to accommodate the many one and one-half story houses that have the sloped attic area finished into bedrooms and similar uses.
- Similar to the previous exception, the 7-foot-high (2134 mm) ceiling must extend over one-third of the required area established in Section 404.4.1. Thus, if a room is larger than the minimum required size for its use, the 7-foot-high (2134 mm) portion may be less than one-third of the room's actual floor area.

Example: A bedroom of 175 square feet (16.3 m²) would be required to have a 7-foot-high (2134 mm) ceiling over no less than 23.3 square feet (2.2 m²) of the room area. The minimum required area of a bedroom is 70 square feet (6.5 m²) (see Section 404.4.1); one-third of the required 70 square feet (6.5 m²) is 23.3 square feet (2.2 m²).

404.4 Bedroom and living room requirements. Every bedroom shall comply with the requirements of Sections 404.4.1 through 404.4.5.

- ❖ The size of bedrooms and living rooms in a dwelling unit are a determining factor in the comfort and safety of occupants. As such, the code establishes minimum sizes and restricts certain configurations in regard to bathrooms, means of egress and other habitable rooms.

404.4.1 Room area. Every living room shall contain at least 120 square feet (11.2 m²) and every bedroom shall contain at least 70 square feet (6.5 m²).

- ❖ The smallest bedroom allowed is 70 square feet (6.5 m²). This is barely enough space for a regular-sized bed and dresser. The smallest living room allowed is 120 square feet (11.1 m²). Utilizing the minimum room width of 7 feet (2134 mm) would result in a living room size of approximately 7 feet by 17 feet (2134 mm by 5182 mm). A more functional room size would perhaps be 10 feet by 12 feet (3048 mm by 3658 mm).

404.4.2 Access from bedrooms. Bedrooms shall not constitute the only means of access to other bedrooms or habitable spaces and shall not serve as the only means of egress from other habitable spaces.

Exception: Units that contain fewer than two bedrooms.

- ❖ Every occupant must be provided with privacy in his or her sleeping room. The need for privacy may lead occupants to lock or barricade doors in certain situations; therefore, if the only access to other habitable spaces or the means of egress is through a bedroom, there is a possibility that the only way out of a dwelling unit may be blocked in an emergency situation. Even without an emergency, occupants may be seriously inconvenienced in their movement about the dwelling unit. Bedrooms, therefore, must be arranged so that other occupants and guests do not have to pass through one bedroom to get to another bedroom or other habitable spaces (see Figure 404.4.2). In addition, dwelling units must be configured such that occupants can egress from any habitable room in the dwelling unit without passing through a bedroom (see the commentary to Section 404.5 for examples of the application of this section). The

exception would permit a dwelling unit with only one bedroom to have an arrangement where the only access to habitable rooms or the means of egress is through the bedroom. It is assumed in this case that only the occupants of the bedroom will require access to other rooms or the means of egress.

404.4.3 Water closet accessibility. Every bedroom shall have access to at least one water closet and one lavatory without passing through another bedroom. Every bedroom in a dwelling unit shall have access to at least one water closet and lavatory located in the same story as the bedroom or an adjacent story.

❖ Every occupant of a bedroom must have access to a water closet without having to pass through another room used as a bedroom. Readily accessible water closets are important for privacy. Occupants should be able to use bathroom facilities without compromising their modesty or the privacy of the occupants in a bedroom. The requirement that every bedroom be served by a water closet and lavatory on the same floor level or on an adjacent level is considered an acceptable minimum standard for the convenience of occupants.

404.4.4 Prohibited occupancy. Kitchens and nonhabitable spaces shall not be used for sleeping purposes.

❖ The code prohibits kitchens, interior public areas and nonhabitable spaces from being used as bedrooms. These spaces provide neither privacy nor safety. Such rooms may also lack adequate light, ventilation, fire exits and sufficient habitable space. This section provides the code official with another tool to control overcrowding problems.

404.4.5 Other requirements. Bedrooms shall comply with the applicable provisions of this code including, but not limited to, the light, ventilation, room area, ceiling height and room width requirements of this chapter; the plumbing facilities and waterheating facilities requirements of Chapter 5; the heating facilities and electrical receptacle requirements of Chapter 6; and the smoke detector and emergency escape requirements of Chapter 7.

❖ Sections 404.4.1 through 404.4.5 do not contain all the code requirements that pertain to bedrooms. Bedrooms are habitable rooms (see the definition and commentary for “Habitable room” in Chapter 2) and as such are subject to all the code requirements that apply to habitable rooms. The purpose of this section is to alert the code user to requirements for bedrooms that are located in other sections and chapters of the code. In particular, see the following sections of the code and the associated commentary:

- Section 402.1 for minimum light requirements;
- Section 403.1 for minimum ventilation requirements;
- Section 404.2 for minimum room width;
- Section 404.3 for minimum ceiling height;
- Section 503.2, which prohibits a toilet room from being the only passageway to a hall or other space from a bedroom;
- Section 505.4, which requires a provision for combustion air in bedrooms that contain a fuel-burning water heater;
- Sections 602.2 and 602.5 for minimum heat required in a bedroom;
- Section 605.2, which requires at least two separate and remote receptacle outlets in each bedroom;
- Section 702.4 for required emergency escape windows and doors in bedrooms; and
- Section 704 for required smoke detectors in the vicinity of the bedrooms.

404.5 Overcrowding. The number of persons occupying a dwelling unit shall not create conditions that, in the opinion of the code official, endanger the life, health, safety or welfare of the occupants.

❖ Overcrowding is often a problem in rental properties and in small single-family dwellings. Overcrowding can create serious problems; for example, disease spreads more easily, privacy is lost, mental health is affected and buildings are subject to more abuse and wear. Overcrowding can have a destructive effect on a whole neighborhood if it takes place in several houses on the same block or in several units in the same apartment building. Reducing overcrowding will reduce related health and safety hazards; therefore, this section gives the code official the authority to provide notice of a violation of overcrowding when in his or her opinion an overcrowding condition exists.

The code requires all types of dwelling units to comply with the minimum room area requirements. There is no exception for owner-occupied houses; however, overcrowding of owner-occupied, single-family residences requires the careful thought and judgement of the code official to determine an appropriate course of action.

Proving that a building is overcrowded may be difficult. Tenants may lie about the number of occupants in their unit to avoid eviction. To determine the number of occupants, the code official may try to count beds or the names on mailboxes. Neighbors may also provide information about the number of occupants and may be able to tell when the occupants are most likely to be home. It may be necessary to conduct inspections during the evening hours in order to find an adult occupant at home. School enrollment records can also provide information on the number of children occupying a residence.

404.6 Efficiency unit. Nothing in this section shall prohibit an efficiency living unit from meeting the following requirements:

1. A unit occupied by not more than two occupants shall have a clear floor area of not less than 220 square feet (20.4 m²). A unit occupied by three occupants shall have a clear floor area of not less than 320 square feet (29.7 m²). These required areas shall be exclusive of the areas required by Items 2 and 3.
2. The unit shall be provided with a kitchen sink, cooking appliance and refrigeration facilities, each having a clear working space of not less than 30 inches (762 mm) in front. Light and ventilation conforming to this code shall be provided.
3. The unit shall be provided with a separate bathroom containing a water closet, lavatory and bathtub or shower.
4. The maximum number of occupants shall be three.

❖ Efficiency units are typically very small apartments consisting of one or two rooms and a bathroom. Efficiency units that comply with this section are not required to comply with the minimum area requirements for bedrooms in Section 404.4. The total allowable number of occupants in the dwelling, however, is limited to two or three, depending on the area of the unit. The purpose of efficiency units and this section is to provide for combined use of spaces in an economical or “efficient” manner without jeopardizing health or comfort. This is possible because of the limit of total occupants to two or three persons.

Item 1 establishes the minimum required area based on the number of occupants. The item states that these areas are exclusive of the areas required by Items 2 and 3. For example, Item 2 requires that the kitchen be provided with (as a minimum) a sink, cooking appliance and a refrigerator. It further requires that each of these have a 30-inch (762 mm) clear working space in front of the fixture or appliance. The space taken up by the appliance and the required clear working space of 30 inches (762 mm) in front of each appliance cannot be included in the minimum required floor space in Item 1 (see the last sentence of Item 1). Similarly, the floor area of the bathroom required in Item 3 is not included in the minimum required floor space in Item 1. Lastly, Item 4 establishes the maximum occupant load as three.

There are no minimum floor areas required in the kitchen or bathroom—there is enough space for the installation of the required fixtures or appliances in each room, and the specified working spaces for the kitchen.

404.7 Food preparation. All spaces to be occupied for food preparation purposes shall contain suitable space and equipment to store, prepare and serve foods in a sanitary manner. There shall be adequate facilities and services for the sanitary disposal of food wastes and refuse, including facilities for temporary storage.

❖ Kitchens must be provided with stoves, ovens, refrigerators, freezers, cabinets, countertops and drawers in sufficient quantity and in a condition that the occupants can store their food safely and at appropriate temperatures to protect the food. All equipment must be constructed and maintained so that it can be cleaned. Food preparation areas must also be provided with garbage disposals or containers that permit the safe temporary storage of garbage and refuse. Containers should be constructed and maintained to prevent insect and rat infestations.

304.18 Building security. Doors, windows or hatchways for dwelling units, room units or housekeeping units shall be provided with devices designed to provide security for the occupants and property within.

❖ This section establishes criteria for providing security for occupants of dwelling units, rooming units and housekeeping units that are rented, leased or let.

304.18.1 Doors. Doors providing access to a dwelling unit, rooming unit or housekeeping unit that is rented, leased or let shall be equipped with a deadbolt lock designed to be readily openable from the side from which egress is to be made without the need for keys, special knowledge or effort and shall have a lock throw of not less than 1 inch (25 mm). Such deadbolt locks shall be installed according to the manufacturer’s specifications and maintained in goodworking order. For the purpose of this section, a sliding bolt shall not be considered an acceptable deadbolt lock.

❖ Everyone has a right to feel safe in their own dwelling; therefore, the installation of locking hardware to secure entry doorways is essential. When installed for security purposes, however, locks and latches can intentionally prohibit the use of an egress door and thus interfere with or prevent the egress of occupants at the time of an emergency, such as a fire. The ability of occupants to easily egress a building in case of a fire or emergency situation is a primary concern to help prevent the loss of human life. Examples of special knowledge would be a combination lock or an unlocking device in an unknown, unexpected or hidden location. Special effort would require unusual and unexpected physical ability to unlock or make the door fully available for egress.

304.18.2 Windows. Operable windows located in whole or in part within 6 feet (1828 mm) above ground level or a walking surface below that provide access to a dwelling unit, rooming unit or housekeeping unit that is rented, leased or let shall be equipped with a window sash locking device.

❖ In order to coordinate the provisions of the code with the U.S. Housing and Urban Development Department (HUD) housing quality standard requirements for rental properties, a height requirement of 6 feet (1827 mm) above the ground was established for windows. This could be considered a security concern, thus dictating the need for window locks.

304.18.3 Basement hatchways. Basement hatchways that provide access to a dwelling unit, rooming unit or housekeeping unit that is rented, leased or let shall be equipped with devices that secure the units from unauthorized entry.

- ❖ Windows to basements are equally problematic from a security point of view and, therefore, need to be equipped with locking devices to provide security for the units.

403.1 Habitable spaces. Every habitable space shall have at least one openable window. The total openable area of the window in every room shall be equal to at least 45 percent of the minimum glazed area required in Section 402.1.

Exception: Where rooms and spaces without openings to the outdoors are ventilated through an adjoining room, the unobstructed opening to the adjoining room shall be at least 8 percent of the floor area of the interior room or space, but not less than 25 square feet (2.33 m²). The ventilation openings to the outdoors shall be based on a total floor area being ventilated.

- ❖ As stated in Section 401.3, mechanical ventilation is an acceptable alternative to the natural ventilation requirements in this section. Most detached single-family dwellings utilize natural ventilation. Every habitable room (see the definition of "Habitable space" in Chapter 2) must have one window that can be easily opened to provide natural ventilation. In order to supply adequate natural ventilation, workable windows must be capable of opening to at least 45 percent of the minimum glazed area required for natural light, as established in Section 402.1 (see the definition of "Openable area" in Chapter 2). The openable area should be measured when the window or door is in its full, open position. When determining openable area, only the space between stops or between stops and sashes is to be measured. The area of sashes, meeting rails, mullions and muntins is to be deducted (see Figure 403.1). The exception allows for rooms to "share" required ventilation openings, as long as there are substantial interior openings between the rooms. The example given in the commentary to Section 402.1 is applicable here (see commentary, Section 402.1).

403.2 Bathrooms and toilet rooms. Every bathroom and toilet room shall comply with the ventilation requirements for habitable spaces as required by Section 403.1, except that a window shall not be required in such spaces equipped with a mechanical ventilation system. Air exhausted by a mechanical ventilation system from a bathroom or toilet room shall discharge to the outdoors and shall not be recirculated.

- ❖ All bathrooms and toilet rooms must have windows that conform to the requirements of Section 402.1 for natural light and Section 403.1 for natural ventilation. If a window is not provided or not large enough to comply with the light and ventilation requirements of these two sections, then an approved mechanical vent may be used.

Mechanical ventilation in dwelling unit bathrooms and toilet rooms must exhaust all of the moistureladen air to the exterior. The vent must not terminate in any attic or other closed space (see Figure 403.2), which would allow moisture to condense on the building structure and lead to deterioration of the structure.

403.3 Cooking facilities. Unless approved through the certificate of occupancy, cooking shall not be permitted in any rooming unit or dormitory unit, and a cooking facility or appliance shall not be permitted to be present in the rooming unit or dormitory unit.

Exceptions:

1. Where specifically approved in writing by the code official.
2. Devices such as coffee pots and microwave ovens shall not be considered cooking appliances.

- ❖ Unless approval has been granted through a certificate of occupancy, cooking is prohibited in dormitory or rooming units (see the definition of "Rooming unit" in Chapter 2). Cooking equipment is prohibited in these types of rooms, since cooking in sleeping areas may create fire and health hazards, as well as odor and moisture problems. Exception 1 provides for the allowance of cooking in a rooming unit or a dormitory unit based on written approval as granted by the code official. Such an allowance should take into consideration the types of food to be cooked and the heat source and conditions under which the cooking will be done. Requiring approval in writing verifies that there will be a traceable, verifiable record of the conditions of approval. Such a record is useful in enforcing the conditions of the approval. Exception 2 allows the use of coffee pots and microwave ovens in rooming units and dormitory units. These types of appliances are typically used for short periods of time, and are currently used in hotel and motel units without significant problems.

403.4 Process ventilation. Where injurious, toxic, irritating or noxious fumes, gases, dusts or mists are generated, a local exhaust ventilation system shall be provided to remove the contaminating agent at the source. Air shall be exhausted to the exterior and not be recirculated to any space.

- ❖ A mechanical vent, hood or cabinet is required when any process creates potentially hazardous fumes, gases or dust. The ventilation has to be located at the source of the contamination and must exhaust directly to the exterior. The criteria for new exhaust systems are found in the *International Mechanical Code*® (IMC®). If the exhausted air contains dust, dirt, chemicals or other contaminants, the exhaust may require additional treatment to prevent contamination of the exterior air (see Figure 403.4).

403.5 Clothes dryer exhaust. Clothes dryer exhaust systems shall be independent of all other systems and shall be exhausted in accordance with the manufacturer's instructions.

- ❖ Clothes dryers are prohibited from exhausting into other ventilation or exhaust systems. Clothes dryers create large volumes of lint, dust and moisture that will clog or corrode any system not designed for this type of exhaust. Additionally, the exhaust gases are hot and may contain combustion products. Improper or inadequate provisions for exhaust may create a fire and health hazard.

Manufacturers' installation instructions must be followed when exhausting clothes dryers.

602.2 Residential occupancies. Dwellings shall be provided with heating facilities capable of maintaining a room temperature of 68°F (20°C) in all habitable rooms, bathrooms and toilet rooms based on the winter outdoor design temperature for the locality indicated in Appendix D of the *International Plumbing Code*. Cooking appliances shall not be used to provide space heating to meet the requirements of this section.

Exception: In areas where the average monthly temperature is above 30°F (-1°C), a minimum temperature of 65°F (18°C) shall be maintained.

- ❖ This section establishes the following minimum requirements for space heating in residential structures.

Adequate heat is required for human health and comfort. The elderly, infirm and very young are most susceptible to illness and death from inadequate space heating.

Heating equipment must be provided and maintained by the owner and must be able to heat all habitable rooms, bathrooms and toilet rooms to at least 68°F (20°C) based on the outside design temperature established for each locality adopting the code. 68°F (20°C) is believed to be the minimum indoor temperature at which people can be reasonably comfortable and can maintain healthy living. This is intended as an absolute minimum since most dwelling occupants will seek indoor temperatures 5°F to 10°F (-15°C to -12°C) higher than this.

The outdoor design temperatures are taken from the ASHRAE *Handbook of Fundamentals* and are listed in Appendix D of the *International Plumbing Code*® (IPC®). Outdoor design temperatures provide a baseline from which heat load calculations are made. Heating system capacity is dependent upon the predicted outdoor temperatures during the heating season. As the outdoor temperature falls, the heat input to a building must increase to offset the increasing heat losses through the building envelope. Heating systems are designed to have the capacity to maintain the desired indoor temperature when the outdoor temperature is at or above the outdoor design temperature. When the outdoor temperatures are below the outdoor design temperature, the heating system will not be able to maintain a desired indoor temperature. It would be impractical, for example, to design a heating system based on the assumption that someday it might be -20°F (-29°C) outdoors if the outdoor temperature in that region rarely, if ever, dropped that low. In such a case, the heating system would be oversized and, thereby, less efficient and economical.

The winter outdoor design temperature is defined as follows: For 97.5 percent of the total hours in the northern hemisphere heating season, from December through February, the predicted outdoor temperatures will be at or above the values given in Appendix D of the IPC. It would be unreasonable to expect any heating system to maintain a desired indoor temperature when the outdoor temperature is below the design temperature. When the 97.5 percent column in Appendix D of the IPC is used, it can be assumed that the actual outdoor temperature will be at or below the design temperature for roughly 54 hours of the total of 2,160 hours in the months of December through February (2,160 hours × 2.5 percent = 54).

The lack of adequate space-heating systems can result in the misuse of cooking appliances. It is not uncommon for occupants to use fuel-fired ovens and cook-top burners to supply space heating when the minimum required indoor temperature cannot be maintained, and unfortunately, the typical occupant is not aware of the danger in doing so. Fuel-fired cooking appliances in almost all occupancies are unvented and, therefore, discharge all products of combustion directly to the occupied space. Prolonged use of such appliances can produce dangerously high levels of carbon monoxide and other contaminants, especially considering that the occupants will not be opening windows or operating exhaust systems in an effort to conserve heat.

Also, cooking appliances are not designed for the purpose of space heating, and like all appliances, could be dangerous if used in any way other than intended by the manufacturer. Cooking appliances are not designed for continuous or unattended use, and open flames, heat radiation and high surface temperatures pose a significant fire hazard when the appliance is misused.

The exception recognizes that in warmer portions of the country, when the average monthly temperature meets or exceeds 30°F (-1°C), the minimum inside temperature can be 65°F (18°C). As a result of this code requirement, the occupants are ensured of having a comfortable interior environment.

505.4 Water heating facilities. Water heating facilities shall be properly installed, maintained and capable of providing an adequate amount of water to be drawn at every required sink, lavatory, bathtub, shower and laundry facility at a temperature of not less than 110°F (43°C). Gas-burning water heater shall not be located in any bathroom, toilet room, bedroom or other occupied room normally kept closed, unless adequate combustion air is provided. An approved combination temperature and pressure-relief valve and relief valve discharge pipe shall be properly installed and maintained on water heaters.

❖ A water heater can be dangerous if it is not properly installed and maintained. A water heater is a closed vessel that can be subjected to high temperature and pressure. Under the right conditions, a water heater can explode violently and cause extensive structural damage to buildings and personal injury or death. As such, water heaters should be thoroughly inspected. The following is a guide for the inspection of water heater systems.

1. Electric water heaters:

- Is the electric service for the house adequate to supply the normal demands of the house as well as the increased demands of a water heater?
- Is the electric wiring for the water heater of adequate size and properly installed in accordance with the electrical code?
- Are all conductors properly installed and protected against physical damage?

2. Fuel-burning water heaters:

- Which fuel is being used? Commonly used fuels include natural gas, propane gas and fuel oil.
- Is the fuel piping constructed from approved materials, properly connected and adequately supported?
- Is there a readily accessible, properly installed shutoff valve to stop the fuel supply?

3. Safety controls (electric and fuel-burning):

- Do the safety controls and devices appear to be in good condition without evidence of tampering or modification?
- Is the thermostat (temperature control) operational and in good condition?
- Does the water heater have a temperature and a pressure relief valve or a combination temperature and pressure relief valve? These safety valves are necessary to relieve excessive pressures, thereby preventing an explosion of the water heater. The temperature and pressure relief valves or combination temperature and pressure relief valve must be rated for a pressure not higher than the working pressure rating of the water heater, and in no case higher than 150 pounds per square inch (psi) (1034 kPa).
- Is the temperature relief-valve-sensing element located in the top 6 inches (152 mm) of the water heater tank? This is the hottest water in the tank.
- Is the relief valve in good condition and free of corrosion or leakage?
- Is the relief valve rating equal to or greater than the British thermal unit per hour (Btu/h) input rating of the water heater? An undersized safety relief valve does not offer adequate protection.

4. Venting:

- Do all fuel-burning water heaters vent the combustion products to an approved chimney or venting system?
- Does the vent have adequate clearance from combustible materials (wood, paper, cloth, etc.)?
- Are the vent or chimney connectors constructed of approved materials? They should be constructed from corrosion-resistant materials such as aluminum, galvanized steel and stainless steel. The joints should be fastened with sheet metal screws, rivets or other approved means.
- Does the chimney, vent or connector show signs of deterioration, corrosion or condensation?
- Is the vent/chimney connector properly supported and connected to the vent or chimney?

If there is a doubt or question about a particular installation (see Figure 505.4), plumbing inspectors or water department officials should be consulted.

Fuel-burning water heaters must not be installed in bathrooms, toilet rooms, bedrooms or any other rooms that are normally kept closed when in use, unless combustion air is brought directly to the appliance from outside of the room. Adequate combustion air must always be provided regardless of the appliance location. The *International Mechanical Code*® (IMC®) prohibits the installation of fuel-fired water heaters in such rooms in all cases, except where the water heater is a direct-vent type or is placed in a dedicated enclosure completely isolated from the occupied room. Asphyxiation of the room occupants could possibly result from inadequate combustion air, venting system failure or appliance malfunction (see Section 603.2).

The code official must also be sure that the water heater is able to provide water of at least 110°F (43°C) to every fixture requiring hot water (see Section 505.1).

Temperature and pressure relief valves are absolutely necessary to prevent the possibility of water heater explosion resulting from overheating.

502.1 Dwelling units. Every dwelling unit shall contain its own bathtub or shower, lavatory, water closet and kitchen sink which shall be maintained in a sanitary, safe working condition. The lavatory shall be placed in the same room as the water closet or located in close proximity to the door leading directly into the room in which such water closet is located. A kitchen sink shall not be used as a substitute for the required lavatory.

❖ Every dwelling unit is to have at least one water closet, one lavatory, one kitchen-type sink and one bathtub or shower to meet the basic requirements for sanitation and personal hygiene.

The lavatory must be located in the same room as or near the door that leads to the water closet. This requirement makes it convenient for occupants to wash their hands after using the water closet, which is good practice for personal hygiene and greatly reduces the spread of germs and bacteria.

The required kitchen sink is intended to provide separate facilities for food preparation and dishwashing and is not intended for hand cleansing after using the toilet facilities, thus reducing the likelihood of contamination of surfaces that are subject to contact with food.

404.7 Food preparation. All spaces to be occupied for food preparation purposes shall contain suitable space and equipment to store, prepare and serve foods in a sanitary manner. There shall be adequate facilities and services for the sanitary disposal of food wastes and refuse, including facilities for temporary storage.

❖ Kitchens must be provided with stoves, ovens, refrigerators, freezers, cabinets, countertops and drawers in sufficient quantity and in a condition that the occupants can store their food safely and at appropriate temperatures to protect the food. All equipment must be constructed and maintained so that it can be cleaned.

Food preparation areas must also be provided with garbage disposals or containers that permit the safe temporary storage of garbage and refuse. Containers should be constructed and maintained to prevent insect and rat infestations.

304.1 General. The exterior of a structure shall be maintained in good repair, structurally sound and sanitary so as not to pose a threat to the public health, safety or welfare.

❖ The exterior of structures must perform four primary functions:

- It must be in good repair. There should be no evidence of deterioration, or damaged or loose elements.
- It must be structurally sound. There should not be any loose or collapsing pieces. Stairways, porches, balconies and similar structural elements must safely perform their intended functions.
- It must be kept in a sanitary condition. There shall be no accumulation of litter or debris on porches and other parts of the exterior structure.
- It must be capable of preventing the elements (rain, snow and wind) and rodents from entering the interior areas.

305.1 General. The interior of a structure and equipment therein shall be maintained in good repair, structurally sound and in a sanitary condition. Occupants shall keep that part of the structure which they occupy or control in a clean and sanitary condition. Every owner of a structure containing a rooming house, housekeeping units, a hotel, a dormitory, two or more dwelling units or two or more nonresidential occupancies, shall maintain, in a clean and sanitary condition, the shared or public areas of the structure and exterior property.

❖ The interior of a structure and its equipment must be maintained so that it does not adversely affect the occupants' health and safety. It must protect occupants from the exterior environment.