



TURTLE CREEK VALLEY COUNCIL OF GOVERNMENTS



Clarifying the Code

Additional Considerations for the IPMC

Introduction

This document is a product of the Turtle Creek Valley Council of Governments, who found it necessary to clarify any uncertainty regarding the codes described in the 2015 IPMC Code and Commentary.

In addition to presenting IPMC Code Text and Commentary in its original form, we offer “Additional Considerations” in most sections, providing commentary specifically relevant to Allegheny County or TCVCOG communities. These sections also offer distilled summaries of key points, as well as suggestions for practical regulation, enforcement, and resolution of potential issues. Multiple sections also outline “Exceptions” to IPMC code, often related to alternative approved methods or situations in which Allegheny County Health Department rules rather than IPMC rules apply.

Ultimately, this product is only a guide that attempts to resolve any confusion or challenges in interpretation, and is not to be used as an adoptable ordinance. Please consult your solicitor for legal advice prior to any practical application.

Acknowledgements

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General

SCOPE

Code Text

The provisions of this chapter shall govern the minimum conditions and the responsibilities of persons for maintenance of structures, equipment and exterior property.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Buildings must comply with the minimum criteria for the provisions of plumbing systems, facilities and fixtures established by this chapter. Any structure that does not conform to these criteria is in violation of the code and is subject to all penalties established by the jurisdiction as indicated in Section 106.

ADDITIONAL CONSIDERATIONS (ALLEGHENY COUNTY):

All repairs and additions to plumbing systems must be permitted and inspected by the Allegheny County Health Department. Require a copy of the County Inspection report prior to issuance of any Certificate of Occupancy. International Plumbing Code does not apply in Allegheny County.

Applies to interior plumbing, sanitary sewer lateral and storm sewer lateral if it is connected into a storm collection system.

Allegheny County Plumbing Code is 78 pages. We do not recommend trying to learn or closely interpret it as the County may have a different interpretation.

Instruct property owner to contact ACHD Plumbing Division. Contact number is 412-578-8036. Website: www.achd.net/plumbing/



General

RESPONSIBILITY

Code Text

The owner of the premises shall maintain the structures and exterior property in compliance with these requirements, except as otherwise provided for in this code. A person shall not occupy as owner-occupant or permit another person to occupy premises that are not in a sanitary and safe condition and that do not comply with the requirements of this chapter. Occupants of a dwelling unit, rooming unit or housekeeping unit are responsible for keeping in a clean, sanitary and safe condition that part of the dwelling unit, rooming unit, housekeeping unit or premises which they occupy and control.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

The owner is responsible for complying with the requirements of Chapter 3, except when the code places the responsibility on the occupants to keep their portion of the premises in a safe and sanitary condition. Simply stated, owners must provide a safe and sanitary property and premises when they rent it for occupancy. Occupants must continue to keep it safe and sanitary while they occupy, control or use the property and premises.



General

VACANT STRUCTURES AND LAND

Code Text

Vacant structures and premises thereof or vacant land shall be maintained in a clean, safe, secure and sanitary condition as provided herein so as not to cause a blighting problem or adversely affect the public health or safety.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Both vacant structures and vacant land present special concerns to communities. Because no one is living on these premises, they are often ignored by the owners. Consequently, this section establishes the code official's authority to order the cleanup of vacant lands and the securing of vacant structures that might present an attractive nuisance.

When the owner fails to secure a vacant structure, Section 108.2 provides the code official with the authority to arrange for securing such buildings. Additionally, Section 110 authorizes the code official to pursue demolition of any structure that is deemed unreasonable to repair. When a structure is reasonable to repair, the code official is authorized to require the necessary repairs.



General

SANITATION

Code Text

Exterior property and premises shall be maintained in a clean, safe and sanitary condition. The occupant shall keep that part of the exterior property that such occupant occupies or controls in a clean and sanitary condition.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

This section establishes a simple, straightforward requirement that exterior areas shall be clean and free from rubbish and garbage (see the definitions in Chapter 2). The code official may find that enforcement of this section is frequently neither straightforward nor simple.

Each jurisdiction has neighborhoods within the overall community that have distinct characteristics. Deteriorated, low-cost housing may dominate in one area, while another has expensive, well-maintained housing units.

ADDITIONAL CONSIDERATIONS:

The occupant shall keep all areas under their control in a clean and sanitary condition. This is one of the rare conditions under the IPMC *where the occupant and not the property owner should be cited*.



Exterior Property Areas

GRADING AND DRAINAGE

Code Text

Exterior property and premises shall be maintained in a clean, safe and sanitary condition. The occupant shall keep that part of the exterior property that such occupant occupies or controls in a clean and sanitary condition.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Improperly graded property areas create health and safety hazards. Stagnant water provides a home for many nuisance insects, especially the mosquito. Stagnant water next to a structure can cause mold growth, which can lead to the decay of wooden members. Pondered water is an attractive nuisance for children and has contributed to numerous drowning deaths.

Stagnant water is foul or stale water. Regrading the premises may be necessary to prevent stagnant water. If regrading is not practical, some type of water diversion system must be installed. Other solutions include replacing nonabsorbent soil with absorbent soil, installing underground drain tile or building an underground leaching pit.

Soil erosion can be a nuisance if material is being deposited in drainage systems or on adjacent properties, and is an indication of improper grading. Planting and maintaining an acceptable ground cover generally prevents erosion.

As indicated by the exception, water retention areas or reservoirs are permitted by the code even though they may contain stagnant water; however, the code official must approve their use.

ADDITIONAL CONSIDERATIONS:

Look for proper grading of land away from buildings. Land that is graded toward the building will cause water infiltration problems and should be addressed.



Exterior Property Areas

SIDEWALKS AND DRIVEWAYS

Code Text

Sidewalks, walkways, stairs, driveways, parking spaces and similar areas shall be kept in a proper state of repair, and maintained free from hazardous conditions.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

The code official is authorized to require that all sidewalks, walkways, stairs, driveways, parking spaces, etc., are usable and kept in proper repair. Walking surfaces that have deteriorated to a condition that presents a hazard to pedestrians must be repaired or replaced to eliminate the hazard and thus reduce the potential for accidents or injuries.

ADDITIONAL CONSIDERATIONS:

This section of the IPMC is very subjective and provides no clear guidelines as to what constitutes "proper repair". Things to look for include raised concrete slabs (especially around trees); slabs that are lifted more than 1" from an adjacent slab; large cracks in concrete or asphalt where a shoe heel or bicycle tire could enter and cause an accident; spalling concrete where the surface has delaminated; potholes in the driveway; and uneven surfaces. Also look for any tripping hazards. When dealing with trees causing damage to sidewalks, keep in mind that many times the municipality owns the trees between the sidewalk and the curb. This may cause issues with property owners who are reluctant to or outright refuse to replace the sidewalk due to the street tree that they do not control. In cases like this, you may want to instruct the property owner to reach out to the municipality for assistance. Regardless of the position of the municipality and their willingness to help the property owner, it is still the responsibility of the property owner to repair or replace the sidewalk.



Exterior Property Areas

WEEDS

Code Text

Premises and exterior property shall be maintained free from weeds or plant growth in excess of the Municipal specific height. Noxious weeds shall be prohibited. Weeds shall be defined as all grasses, annual plants and vegetation, other than trees or shrubs provided; however, this term shall not include cultivated flowers and gardens.

Upon failure of the owner or agent having charge of a property to cut and destroy weeds after service of a notice of violation, they shall be subject to prosecution in accordance with Section 106.3 and as prescribed by the authority having jurisdiction. Upon failure to comply with the notice of violation, any duly authorized employee of the jurisdiction or contractor hired by the jurisdiction shall be authorized to enter upon the property in violation and cut and destroy the weeds growing thereon, and the costs of such removal shall be paid by the owner or agent responsible for the property.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Criteria establishing maximum heights for grass and weeds are necessary to reduce rodent shelters and pollen dust problems.

This section provides a mechanism for removal of weeds on neglected or abandoned properties after proper notice has been given to the responsible owner or agent (see Sections 107 and 108.3). It is important that the code official act quickly in requiring weed removal to prevent the weeds from contributing to a blight condition that could eventually become a harbor for pests and rodents.

All noxious weeds are prohibited; however, each community has different weeds that are considered noxious. The code official should confer with the state or local agricultural agent to become familiar with weeds that are noxious in his or her community.

Vegetation that is growing up walls and in gutters are particularly destructive and should be eliminated.



Cultivated flowers and gardens are not considered to be weeds. The word “cultivated” is important. Cultivated is defined as “to loosen or dig (soil) around growing plants.” Uncultivated gardens should be treated the same as weeds and tall grasses.



Exterior Property Areas

RODENT HARBORAGE

Code Text

Structures and exterior property shall be kept free from rodent harborage and infestation. Where rodents are found, they shall be promptly exterminated by approved processes that will not be injurious to human health. After pest elimination, proper precautions shall be taken to eliminate rodent harborage and prevent reinfestation.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Rodents carry disease organisms in their feces and on their bodies. The code official must require the extermination of all rodents by approved processes. All harborage areas should be eliminated by removing piles of rubbish, towing or repairing inoperable cars and cutting back weeds. Garbage should be stored in solid containers with tight-fitting lids and disposed of regularly.

ADDITIONAL CONSIDERATIONS:

During the inspection, look for areas of possible rodent harborage. Look for chewed holes in the structure(s) on the property, feces, torn trash bags and holes in the ground, which are all indicators of rodents. As the Code Official, you must require the extermination of rodents, the elimination of areas of rodent harborage and the repair of all damaged structures. Require the submission of receipts for pest control services for services rendered to address rodent issues.



Exterior Property Areas

EXHAUST VENTS

Code Text

Pipes, ducts, conductors, fans or blowers shall not discharge gases, steam, vapor, hot air, grease, smoke, odors or other gaseous or particulate wastes directly upon abutting or adjacent public or private property or that of another tenant.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

There are three common problems associated with exhaust vent discharges:

1. Odor problems caused by exhaust gases emanating from business and industrial properties
2. Noise problems created by exhaust vents.
3. Health and safety problems created by exhausts that contain hazardous or potentially hazardous discharge.

To reduce these problems, exhaust vents are prohibited from discharging directly on abutting or adjacent public and private property.

ADDITIONAL CONSIDERATIONS:

Look for exhaust vents and other discharges near windows of neighboring properties or tenants. Pay special attention to the location of exhaust vents for high efficiency furnaces and water heaters and ensure that they do not vent directly into a neighboring structure.



Exterior Property Areas

ACCESSORY STRUCTURES

Code Text

Accessory structures, including detached garages, fences and walls, shall be maintained structurally sound and in good repair.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Accessory structures must be maintained in accordance with the criteria established by this section. Property owners often give detached garages, sheds, fences, retaining walls and similar structures a lower maintenance priority than the primary structure; thus, these structures are more frequently in disrepair. A thorough inspection of all property areas and accessory buildings is necessary to identify violations of the code and to improve a neighborhood's appearance.

ADDITIONAL CONSIDERATIONS:

This is another section of the IPMC which is very subjective, but also very important. Assure that all accessory structures are safe and not in danger of falling. Accessory structures should follow the same basic standards as the principal structures in that doors; windows and skylights should be leak-proof and sealed properly; roofs should not leak; walls and foundations should be free of holes and damage; and the buildings should not be in danger of falling. Accessory structures with electricity must have GFCI Controlled outlets and proper wiring (correct gauge to correspond to breakers and outlets).



Exterior Property Areas

MOTOR VEHICLES

Code Text

Except as provided for in other regulations, no inoperative or unlicensed motor vehicle shall be parked, kept or stored on any premises, and no vehicle shall at any time be in a state of major disassembly, disrepair, or in the process of being stripped or dismantled. Painting of vehicles is prohibited unless conducted inside an approved spray booth.

Exception:

A vehicle of any type is permitted to undergo major overhaul, including body work, provided that such work is performed inside a structure or similarly enclosed area designed and approved for such purposes.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Improper storage of inoperable vehicles can be a serious problem for a community. The vehicles are unsightly, clutter the neighborhood, provide a harborage for rodents and are an attractive nuisance for children.

This section establishes criteria for acceptable vehicle storage. No inoperable or unlicensed vehicles are permitted on a property unless approved in other regulations adopted by the community. This regulation addresses two problems associated with vehicle storage and repair

1. The blighting influence that improperly stored inoperable vehicles have on a neighborhood.
2. The neighborhood mechanic who attempts to operate a vehicle repair business from home.

Major vehicle repairs are permitted, but only if the work is performed in a structure designed and approved for such use. Of course, this regulation does not affect the storage of vehicles on property that complies with applicable zoning or license requirements, such as repair garages, salvage yards and similar establishments.



ADDITIONAL CONSIDERATIONS:

Consult with the local police department for assistance with removing vehicles. Many municipalities have additional ordinances regarding the storage of disabled vehicles which may give you more latitude in dealing with these nuisances.

Turn over illegal repair shops to the local Zoning Officer to deal with if they are not in a location zoned for this type of use.

Make sure that local garages, whether private or for-profit, use proper exhausting while painting cars in the garage. Also ensure that the discharge does not cause a nuisance to neighboring property owners. (e.g., blowing or spraying paint onto neighboring properties).

A good way to think of enforcement of vehicles is that it must be “road legal,” meaning registered, fully insured, and have a current inspection.



Exterior Property Areas

DEFACEMENT OF PROPERTY

Code Text

No person shall willfully or wantonly damage, mutilate or deface any exterior surface of any structure or building on any private or public property by placing thereon any marking, carving or graffiti. It shall be the responsibility of the owner to restore said surface to an approved state of maintenance and repair.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Graffiti, carving and damage is a problem that plagues exterior surfaces of walls, fencing and sidewalks in cities and towns of all sizes. This problem begins as an eyesore and can result in serious consequences, including declining property values and degradation of the structures' ability to repel rain and snow.

It must be the responsibility of the owner to restore said surface to an approved state of maintenance and repair.



Swimming Pools, Spas, and Hot Tubs

SWIMMING POOLS

Code Text

Swimming pools shall be maintained in a clean and sanitary condition, and in good repair.



Swimming Pools, Spas, and Hot Tubs

ENCLOSURES

Code Text

Private swimming pools, hot tubs and spas, containing water more than 24 inches in depth shall be completely surrounded by a fence or barrier not less than 48 inches in height above the finished ground level measured on the side of the barrier away from the pool. Gates and doors in such barriers shall be self-closing and self-latching. Where the self-latching device is not less than 54 inches above the bottom of the gate, the release mechanism shall be located on the pool side of the gate. Self-closing and self-latching gates shall be maintained such that the gate will positively close and latch when released from an open position of 6 inches from the gatepost. No existing pool enclosure shall be removed, replaced or changed in a manner that reduces its effectiveness as a safety barrier.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

These performance-based criteria were specifically added to address pool-related problems where a child could possibly drown by gaining entry into a pool through a gate that failed to close and latch properly. Gates that may have deteriorated over time through age, wear and exposure to the elements are now addressed so that they will continue to provide the intended level of protection.

The exception to this section allows for safety covers that comply with ASTM F1346. This exception is consistent with current provisions in the IBC and the International Residential Code® (IRC®)

ASTM F1346 requires fastening the safety cover to the hot tub or spa via key locks, combination locks or similar devices that will keep the cover in place; testing to demonstrate that the cover can support a minimum required weight; limitations on openings in the cover; and minimum installation requirements.

ADDITIONAL CONSIDERATIONS:

Swimming pools, hot tubs or spas with a water depth greater than 24" shall be completely surrounded by a barrier or fence not less than 48" high measured from the finished grade on the exterior of the pool or hot tub. All gates and doors to the pool area must be self-closing and self-latching. Self-closure must



work when the gate is opened greater than 6". The latch must be located on the pool side of the gate if the latch is less than 54" from finished grade.



Exterior Structure

GENERAL

Code Text

Code 304.1.1

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.

Code 304.1.1 Unsafe Conditions

The following conditions shall be determined as unsafe and shall be repaired or replaced to comply with the International Building Code or the International Existing Building Code as required for existing buildings:

- The nominal strength of any structural member is exceeded by nominal loads, the load effects or the required strength
- The anchorage of the floor or roof to walls or columns, and of walls and columns to foundations, is not capable of resisting all nominal loads or load effects
- Structures or components thereof that have reached their limit state
- Siding and masonry joints including joints between the building envelope and the perimeter of windows, doors and skylights are not maintained, weather resistant or water tight
- Structural members that have evidence of deterioration or that are not capable of safely supporting all nominal loads and load effects
- Foundation systems that are not firmly supported by footings, are not plumb and free from open cracks and breaks, are not properly anchored or are not capable of supporting all nominal loads and resisting all load effects
- Exterior walls that are not anchored to supporting and supported elements or are not plumb and free of holes, cracks or breaks and loose or rotting materials, are not properly anchored or are not capable of supporting all nominal loads and resisting all load effects
- Roofing or roofing components that have defects that admit rain, roof surfaces with inadequate drainage, or any portion of the roof framing that is not in good repair with signs of deterioration, fatigue or without proper anchorage and incapable of supporting all nominal loads and resisting all load effects



- Flooring and flooring components with defects that affect serviceability or flooring components that show signs of deterioration or fatigue, are not properly anchored or are incapable of supporting all nominal loads and resisting all load effects
- Veneer, cornices, belt courses, corbels, trim, wall facings and similar decorative features not properly anchored or that are anchored with connections not capable of supporting all nominal loads and resisting all load effects
- Overhang extensions or projections including, but not limited to, trash chutes, canopies, marquees, signs, awnings, fire escapes, standpipes and exhaust ducts not properly anchored or that are anchored with connections not capable of supporting all nominal loads and resisting all load effects;
- Exterior stairs, decks, porches, balconies and all similar appurtenances attached thereto, including guards and handrails, are not structurally sound, not properly anchored or that are anchored with connections not capable of supporting all nominal loads and resisting all load effects; or
- Chimneys, cooling towers, smokestacks and similar appurtenances not structurally sound or not properly anchored, or that are anchored with connections not capable of supporting all nominal loads and resisting all load effects.

Exceptions:

1. Where substantiated otherwise by an approved method.
2. Demolition of unsafe conditions shall be permitted where approved by the code official.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Code 304.1

The exterior of structures must perform four primary functions:

1. It must be in good repair. There should be no evidence of deterioration, or damaged or loose elements.
2. 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.
3. 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.
4. It must be capable of preventing the elements (rain, snow and wind) and rodents from entering the interior areas.



Code 304.1.1

The purpose of these requirements is to set out general and specific delineations in a building or structure that would make it unsafe. These delineations allow the code official more specific references to conditions that characterize an unsafe building or structure.

Section 304.1.1 describes in detail unsafe conditions related to the exterior of the structure to provide the code official the ability to require replacement or repair.

Item 1 indicates that if the strength of the structural member is exceeded by either the nominal loads or load effects, the condition is to be regarded as unsafe. Nominal strength and load effects, as defined by the IBC and Items 2–13 of this section, are when a structure or component is regarded as incapable of performing its intended function and thus becomes unsafe.

Item 2 deals with required strength of connections between structural members. More specifically, each connection must be able to resist nominal loads and load effects; otherwise, the building or affected portion thereof is to be regarded as unsafe. Anchorage of various elements of a structure is essential to its stability. When anchorage is not capable of transferring the intended loads, the structure or component is said to be unsafe.

Item 3 specifies that any condition beyond which a structure or member becomes unfit for service and is no longer useful for its intended function is to be unsafe. This includes its serviceability limit and strength limit state. "Limit state," as defined by the IBC, is a condition beyond which a structure or member becomes unfit for service and is no longer useful for its intended function (serviceability limit state) or to be unsafe (strength limit state). Any structure reaching this state is said to be unsafe.

Since weather penetration can degrade structural components, Item 4 specifies that if any joint in the building envelope allows weather to penetrate, it may be used as a basis to classify the structure as unsafe. This may be, in and of itself, the basis for the classification. However, supporting evidence of deterioration caused by the penetration would add further legitimacy to the characterization as unsafe.

Item 5 addresses structural members. Structural members are essential to the structural integrity of any building. If any structural member is deteriorated to the point that it cannot safely support the nominal loads, the building may be regarded as unsafe.

Item 6 addresses foundations. Foundation systems are essential to the structural integrity of any building. If any portion of any foundation system is not supported by adequate soil, is not plumb as intended to distribute the loads, has cracks or breaks or is inadequately anchored, the building may be regarded as unsafe.



Item 7 addresses exterior walls. Exterior walls are essential to the structural integrity of any building. If any portion of any exterior or bearing wall system is not supported by adequate foundation, is not plumb as intended to distribute the loads, has cracks or breaks or is inadequately anchored, the building may be regarded as unsafe.

Item 8 addresses roofing and roofing components. Since weather penetration can degrade structural components, this section specifies that if any roof component allows weather to penetrate, it may be used as a basis to classify the structure as unsafe. This may be, in and of itself, the basis for the classification. However, supporting evidence of deterioration caused by the penetration would add weight to the characterization as unsafe. Additionally, any structural component of the roof assembly not capable of supporting design loads is a basis for classifying as unsafe.

Item 9 addresses flooring and flooring components. Walking surfaces in floors with fatigue, defects or deterioration are a basis for determining that a building or structure is unsafe. If a floor may collapse due to any of these conditions or is likely to cause harm or injury, it may be regarded as unsafe.

Item 10 addresses exterior wall facings. Decorative features either inside or outside that may become detached and fall is a basis for classifying a building or portion thereof as unsafe. Lateral movement, such as an earthquake or wind, may cause any feature such as this to fall if not secured properly.

Item 11 addresses overhangs and projections from a building. As with decorative features, any overhang, extension or projection—such as trash chutes, canopies, marquis, sign, etc.—that is not anchored properly and can fall is a basis for declaring that an unsafe condition exists.

Item 12 addresses exterior stairs, decks and similar appurtenances. Exterior stairs, decks, porches, balconies and all similar appurtenances are all portions of a means of egress system and as such represent a significant safety concern if left in an unsafe condition. Should any of these elements of a means of egress system become structurally unsound, the building or portion thereof may be regarded as unsafe.

Item 13 addresses chimneys, cooling towers and similar appurtenances. As with decorative features and other appurtenances, chimneys, cooling towers, smokestacks or similar large vertical elements that become structurally unsound may be regarded as unsafe.

Exception 1 is to recognize that a qualified entity could substantiate an alternative method or material that meets the purpose and intent of the code. This alternative would need to be approved by the code official. An engineering study that substantiates the structural integrity in a rational analysis may be the basis for accepting a contention that the building is not unsafe.



Exception 2 allows a building owner the option of demolition of an unsafe condition subject to the code official's approval. If the building or structure or portion thereof is demolished, and does not exist, the condition is considered to be resolved.



Exterior Structure

PROTECTIVE TREATMENT

Code Text

Exterior surfaces, including but not limited to, doors, door and window frames, cornices, porches, trim, balconies, decks and fences, shall be maintained in good condition. Exterior wood surfaces, other than decay-resistant woods, shall be protected from the elements and decay by painting or other protective covering or treatment. Peeling, flaking and chipped paint shall be eliminated and surfaces repainted. Siding and masonry joints, as well as those between the building envelope and the perimeter of windows, doors and skylights, shall be maintained weather resistant and water tight. Metal surfaces subject to rust or corrosion shall be coated to inhibit such rust and corrosion, and surfaces with rust or corrosion shall be stabilized and coated to inhibit future rust and corrosion. Oxidation stains shall be removed from exterior surfaces. Surfaces designed for stabilization by oxidation are exempt from this requirement.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Other sections of the code require items such as walls, doors, windows and architectural trim to be maintained in good repair and condition. This section makes it clear that if paint or other protective covering or treatment is used to provide protection from the elements, it cannot be peeling, flaking or chipped. Additionally, buildings with deteriorated paint or with masonry joints and siding in disrepair or not weather tight will eventually decay and exert a blighting influence on the community.

ADDITIONAL CONSIDERATIONS:

Although this section is rather wordy, it covers all potential exterior surfaces of a building including all decorative elements of the building. Basically, all painted surfaces or surfaces with other protective coatings cannot be flaking, peeling or chipped. All mortar joints, damaged siding and other finishes must be repaired to provide a watertight seal on the entire building.



Exterior Structure

PREMISES

Code Text

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 not less than 4 inches (102 mm) in height with a minimum stroke width of 0.5 inch (12.7 mm).

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Identifying buildings during an emergency (i.e., fire department, ambulances, medical, police) is greatly aided by the proper placement of address identification. Other than emergencies, the address identification serves as a convenience for people attempting to locate a building. The size and contrast criteria are intended to aid visibility from the street. Where multiple structures are remotely located on a site or set back into a property, at locations where multiple addresses are provided (e.g., strip malls) or where the address is not readily visible from the public way, an approved method of identification will also be required. The fire code official has the authority to require that address numbers be located in all locations deemed necessary to properly identify the building by street address. The primary concern is for emergency personnel to locate the building without going through a lengthy search procedure. In the case of a strip mall, identification would be provided for the backs of buildings that face alleys or roads since the emergency response unit may often be directed to the back entrance. The address numbers must be maintained in a readily visible condition to provide for continuous identification. This would include repainting faded numbers or trimming trees or other vegetation that may be obscuring visibility of the address.

ADDITIONAL CONSIDERATIONS:

Look for the following items concerning the address identification:

- Must be numbers and letters only. No script.



- Minimum height of 4", minimum width of 1/2". (The International Fire Code requires a minimum height of 6" for Commercial Structures).
- Address must be visible from the street that the property front is on. No trees or shrubs should obscure the address.
- If the house is not visible from the street or sits a distance from the street, a supplemental address sign shall be installed near the roadway.
- The coloring of the numbers must contrast with the building color.
- Multi-unit commercial buildings shall have front and rear addresses. (Apartment buildings with 3 or more units are considered commercial).
- Numbers should be beside the door or above the door. The IPMC does not require a specific height where they are to be located.



Exterior Structure

STRUCTURAL MEMBERS

Code Text

Structural members shall be maintained free from deterioration, and shall be capable of safely supporting the imposed dead and live loads.

(IPMC definition of deterioration is "To weaken, disintegrate, corrode, rust or decay and lose effectiveness")

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Building components that must support other building components are considered structural. Structural members must be kept sound and capable of supporting all of the dead and live loads imposed upon them. Dead loads are the loads created by the structure itself. The footing must adequately carry the load of the foundation, beams, joists, walls, roof and other similar members located above it.

Live loads are the weights that are added to the finished structure. Live loads include furniture, appliances, equipment and other items added to the inside of the building. Snow, rain, ice and wind are environmental conditions that are also considered live loads in the code.



Exterior Structure

FOUNDATION WALLS

Code Text

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.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

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 Commentary 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 the 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 also be corrected.

ADDITIONAL CONSIDERATIONS

Exterior

Look for decay of foundation walls; cracks in blocks and between blocks; separation in rubblestone; and separation between block and sill plate. If you encounter these scenarios or other issues with foundations, require an engineer to design the repair and provide sealed drawings. Also require a building permit if necessary and/or provide a letter after a repair has been made stating that the foundation is capable of supporting the imposed loads. Alternatively, you can always require a sealed



engineer's report stating that the structure is structurally sound without making repairs. The liability for the inspection of this component then falls on the engineer rather than the inspector.

Interior

Look for cracks in the mortar joints; loose or flaking mortar; missing mortar; evidence of water penetration; cracks in the block; surface deterioration of block or concrete; and separation between the block and sill plate or floor joints. Major problems must be repaired/replaced. Minor problems must be repaired.



Exterior Structure

EXTERIOR WALLS

Code Text

Exterior walls shall be free from holes, breaks, and loose or rotting materials; and maintained weatherproof and properly surface coated where required to prevent deterioration.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Holes, cracks, decayed wood or any other condition that permits rain or dampness to enter the structure must be repaired. Exterior surface materials must be properly coated to prevent deterioration if they are not naturally decay resistant. Many materials do not require surface coating, including the following: certain metals (aluminum, copper, etc.); masonry products (bricks, stone, stucco, etc.); naturally, decay-resistant woods (redwood, cedar, etc.); and woods that have been treated with chemicals to prevent decay.

ADDITIONAL CONSIDERATIONS

This is primarily designed to prevent damage from moisture.



Exterior Structure

ROOFS AND DRAINAGE

Code Text

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. Roof water shall not be discharged in a manner that creates a public nuisance.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

A secure, non-leaking 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.

ADDITIONAL CONSIDERATIONS

Although the IPMC is silent as to whether gutters and downspouts are necessary, in practicality this is the only way to keep roof water from deteriorating the exterior of the structure, causing foundation damage and promoting proper drainage of the roof water away from the building. Downspouts must not discharge directly adjacent to the foundation of the structure or an adjacent structure or onto a road or sidewalk where they could potentially cause an icing condition. Flashing around chimneys and valleys should be inspected to the fullest extent possible. Flashing on the bottom side of the chimney should be exposed so the water drains over the shingles rather than under. Where flashing around a chimney or



against the structure is sealed with any type of sealant, there shall be no cracks or degradation in the sealant material.



Exterior Structure

DECORATIVE FEATURES

Code Text

Cornices, belt courses, corbels, terra cotta trim, wall facings and similar decorative features shall be maintained in good repair with proper anchorage and in a safe condition.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Exterior decorative features require regular maintenance to prevent their deterioration and to keep them from falling from the building.

ADDITIONAL CONSIDERATIONS

Although it may seem that this is an innocuous requirement that is overlooked by many inspectors, this requirement is to prevent any of the above listed features from falling off of a structure and injuring someone or causing damage to the structure or other property.



Exterior Structure

OVERHANG EXTENSIONS

Code Text

Overhang extensions including, but not limited to, canopies, marquees, signs, metal awnings, fire escapes, standpipes and exhaust ducts shall be maintained in good repair and be properly anchored so as to be kept in a sound condition. Where required, all exposed surfaces of metal or wood shall be protected from the elements and against decay or rust by periodic application of weather-coating materials, such as paint or similar surface treatment.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Most problems related to overhang extensions, especially signs, marquees, fire escapes and awnings, are a result of deterioration at the points where they are anchored to the building. Anchorage points should be carefully inspected on a regular basis.

Fire escapes, standpipes and exhaust ducts serve the critical functions of providing proper exiting, fire protection and the removal of exhaust products. Regular maintenance is important for their continued compliance with the code.

ADDITIONAL CONSIDERATIONS

Anchorage points are the most common problems for deterioration of signs, marquees, fire escapes and awnings. Inspect these locations very carefully. Regular maintenance of all of these elements is critical to the safety of the building. If it looks like these elements have not been adequately maintained, direct the building owner to take some efforts at maintaining these critical components.



Exterior Structure

STAIRWAYS, DECKS, PORCHES, AND BALCONIES

Code Text

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.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

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.

Although not mandated, the applicable building code could be consulted for the live loads that these elements are typically required to support.

ADDITIONAL CONSIDERATIONS

Check each of these items for regular maintenance. Determine if they are a hazard to the residents or public. Check all anchorage points to the building. You may use the IBC or IRC for the applicable live loads. It is not required, but is permitted.



Exterior Structure

CHIMNEYS AND TOWERS

Code Text

Chimneys, cooling towers, smoke stacks, and similar appurtenances shall be maintained structurally safe and sound, and in good repair. Exposed surfaces of metal or wood shall be protected from the elements and against decay or rust by periodic application of weather-coating materials, such as paint or similar surface treatment.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Chimneys, towers of all types and other similar appurtenances are frequently ignored until they become nonfunctional or are in danger of collapse. Because of the corrosiveness of exhaust gases, chimneys and smokestacks often deteriorate on the inside first. The code official should examine chimneys and towers for excessive rust, loose or missing mortar, and cracked or disintegrating bricks.

Occasionally, deterioration may prevent the chimney or smokestack from operating properly. Obstructed chimneys have resulted in numerous carbon monoxide deaths. If fuel-burning appliances vent into chimneys or smokestacks, the code official should see that the exhaust gases are being properly conveyed to the chimney, including the connection of the vent to the chimney.

Weather-coating materials may be applied periodically to reduce the effects of the elements on these items.

ADDITIONAL CONSIDERATIONS

Chimneys and cooling towers tend to disintegrate from the inside out. Therefore, if there is proof of decay on the outside such as rust, loose or missing mortar, or cracked or disintegrating bricks, then the Code Official should order the repair of the deteriorated component. If a chimney or smokestack looks disintegrated, activate the appliances that are attached to the chimney to make sure they are venting properly.



Exterior Structure

HANDRAILS AND GUARDS

Code Text

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

ADDITIONAL CONSIDERATIONS

The best way to check a guard for its ability to support a normally imposed load is to carefully lean against it. If there is any movement or deflection then the component shall be ordered to be repaired.



Exterior Structure

WINDOW, SKYLIGHT AND DOOR FRAMES

Code Text

Every window, skylight, door and frame shall be kept in sound condition, good repair and weather tight.

304.13.1 Glazing

Glazing materials shall be maintained free from cracks and holes.

304.13.2 Openable windows

Every window, other than a fixed window, shall be easily openable and capable of being held in position by window hardware.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

304.13

All windows, skylights and doors must be installed in their frames so that they are weather tight (i.e., able to prevent wind, rain or other elements from entering the structure). A workmanlike installation will provide appropriate protection while maintaining operational capability.

304.13.1

All glass is to be maintained without open cracks or holes, which can admit wind and moisture. Defective glass poses hazards to occupants.

304.13.2

Windows that have broken or are missing hold-open hardware create a dual hazard.



First, windows without hardware are frequently propped open with sticks and other objects. These objects can be dislodged and cause the windows to fall, causing bodily injuries.

Second, in the event of a fire, occupants are at an increased risk if windows cannot be readily secured in an open position. People have died because of inoperable windows, even though they could have easily broken the windows and escaped. It is advisable for the code official to check windows to make sure they open properly and remain open with their own hardware.

ADDITIONAL CONSIDERATIONS

The Code Official shall open each and every window in the structure to ensure that they open and close properly and can stay open without using anything to prop them open. When inspecting a multi-unit building, the code official shall check all windows, doors and skylights in the common areas of the building each and every time they are in the building.

ALL windows that are designed to be opened must open and function properly. The size of the window openings does not matter under the IPMC.



Exterior Structure

INSECT SCREENS

Code Text

Every window, skylight, door and frame shall be kept in sound condition, good repair and weather tight. During the period from [DATE] to [DATE] , every door, window and other outside opening required for ventilation of habitable rooms, food preparation areas, food service areas or any areas where products to be included or utilized in food for human consumption are processed, manufactured, packaged or stored shall be supplied with approved tightly fitting screens of minimum 16 mesh per inch (16 mesh per 25 mm), and every screen door used for insect control shall have a self-closing device in good working condition.

Exception:

Screens shall not be required where other approved means, such as air curtains or insect repellent fans, are employed.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Screens reduce insect infestations. Communities are required to establish the number of months screens must be used on windows and doors to accommodate the time period that insects are active. Insect populations become dormant or die during the cold season; thus, screens would not be required during cold months. The requirements for tight-fitting screens (not less than 16 mesh per 25 mm) in any food preparation, storage or service area are extremely important. Improper insect protection in these areas can lead to large-scale contamination of food supplies. As indicated in the exception, air curtains, insect repellent fans or similar systems may be accepted. The code official must be sure that such a system is operational and employed whenever the doors and windows are open. Although permitted for any opening, these systems are useful for openings that are difficult to screen properly, such as out-swinging doors.



ADDITIONAL CONSIDERATIONS

Screens are not required where other approved means such as air curtains or insect repellent fans are used (commercial applications). Although the code requires the municipality to specify a date range for the use of screens, the TCVCOG decided to enforce the screen requirement at all inspections since there is a high probability that an inspector will not be back to the structure for another inspection during the period that screens are required. If the structure has storm windows installed at the time of the inspection which require that the screens be removed, make sure that the screens are on-site.



Exterior Structure

DOORS

Code Text

Exterior doors, door assemblies, operator systems if provided, and hardware shall be maintained in good condition. Locks at all entrances to dwelling units and sleeping units shall tightly secure the door. Locks on means of egress doors shall be in accordance with Section 702.3.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Basement hatchways must prevent rain, water and rodents from entering the structure. When maintenance is ignored, wood members (including doors) decay, metal doors and latches rust and hinges break.

Drainage must be provided to prevent water from accumulating around hatchways and leaking inside the structure.



Exterior Structure

BASEMENT HATCHWAYS

Code Text

Every basement hatchway shall be maintained to prevent the entrance of rodents, rain and surface drainage water.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

All exterior doors, door assemblies, operator systems and hardware must properly perform their intended functions (e.g., open and close easily and keep out the elements). Locks must be readily released without keys, special knowledge or effort in accordance with Section 702.3. Security locks that comply with this requirement must function to secure the door as well. Malfunctioning or sticking locks that cannot secure the door may also impede egress because of difficulty in operation or release. The phrase “operator systems if provided” draws attention to automated doors. Maintaining the proper performance of the operator systems, where present, further assures proper egress will be maintained.

ADDITIONAL CONSIDERATIONS

All doors and locks must be operable and cannot be overly difficult to open. **Locks cannot require a key to open from the inside.**



Exterior Structure

GUARDS FOR BASEMENT WINDOWS

Code Text

Every basement window that is openable shall be supplied with rodent shields, storm windows or other approved protection against the entry of rodents.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Basement windows are especially susceptible to the entry of the Norway rat, one of several rodents that frequently nest in the ground near structures. Rat-proof shields, screens, storm windows or other protective materials must be installed on windows capable of being opened to eliminate their use as an entry point.



Exterior Structure

BUILDING SECURITY

Code Text

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.

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 minimum lock throw of 1 inch (25 mm). Such deadbolt locks shall be installed according to the manufacturer's specifications and maintained in good working order. For the purpose of this section, a sliding bolt shall not be considered an acceptable deadbolt lock.

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.

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.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

304.18.1

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

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

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.



Exterior Structure

GATES

Code Text

Exterior gates, gate assemblies, operator systems if provided, and hardware shall be maintained in good condition. Latches at all entrances shall tightly secure the gates.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

All gate assemblies, operator systems and hardware must be maintained to perform their intended functions (i.e., open and close as intended). Malfunctioning or sticking latches that cannot secure the gate may also impede egress because of difficulty in operation or release. The phrase “operator systems if provided” draws attention to automated doors. Maintaining the proper performance of the operator systems, where present, further assures proper egress will be maintained.

ADDITIONAL CONSIDERATIONS

If gates are installed, the latches must work properly and must not stick. Automated door controllers (where installed) must always function properly.



Interior Structure

GENERAL AND UNSAFE CONDITIONS

Code Text

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 that 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 non-residential occupancies, shall maintain, in a clean and sanitary condition, the shared or public areas of the structure and exterior property.

305.1.1 Unsafe conditions sc

The following conditions shall be determined as unsafe and shall be repaired or replaced to comply with the International Building Code or the International Existing Building Code as required for existing buildings:

- The nominal strength of any structural member is exceeded by nominal loads, the load effects or the required strength;
- The anchorage of the floor or roof to walls or columns, and of walls and columns to foundations is not capable of resisting all nominal loads or load effects;
- Structures or components thereof that have reached their limit state;
- Structural members are incapable of supporting nominal loads and load effects;
- Stairs, landings, balconies and all similar walking surfaces, including guards and handrails, are not structurally sound, not properly anchored or are anchored with connections not capable of supporting all nominal loads and resisting all load effects;
- Foundation systems that are not firmly supported by footings are not plumb and free from open cracks and breaks, are not properly anchored or are not capable of supporting all nominal loads and resisting all load effects.



Exceptions:

1. Where substantiated approved method otherwise by an approved method.
2. Demolition of unsafe conditions shall be permitted when approved by the code official.

IPMC Commentary**COMMENTARY AND CONSIDERATIONS****305.1**

The interior of a structure and its equipment must be maintained so as not to adversely affect the occupants' health and safety. A structure must protect occupants from the exterior environment.

305.1.1

Section 305.1.1 describes unsafe conditions related to the interior of the structure, and thus details situations which can prompt the code official to require replacement or repair.

Item 1 indicates that if the strength of the structural member is exceeded by either the nominal loads or load effects, the condition is to be regarded as unsafe. Nominal strength and load effects, as defined by the IBC and Items 2–6 of this section, are when a structure or component is regarded as incapable of performing its intended function and thus becomes unsafe.

Item 2 deals with required strength of connections between structural members. More specifically, each connection must be able to resist nominal loads and load effects; otherwise, the building or affected portion thereof is to be regarded as unsafe. Anchorage of various elements of a structure is essential to its stability. When anchorage is not capable of transferring the intended loads, the structure or component is said to be unsafe.

Item 3 specifies that any condition beyond which a structure or member becomes unfit for service and is no longer useful for its intended function is considered to be unsafe. This includes its serviceability limit and strength limit state. "Limit state," as defined by the IBC, is a condition beyond which a structure or member becomes unfit for service and is no longer useful for its intended function (serviceability limit state) or to be unsafe (strength limit state). Any structure reaching this state is said to be unsafe.

Items 4 through 6: The interior of a building may contain other structural elements as well. These items, which include stairs, walking surfaces, handrails and guards, are specifically denoted as essential structural elements that must be preserved to allow for safe means of egress and protection.



Item 4 addresses structural members that have become unable to support the intended loads.

Item 5 addresses interior stairs, decks, porches, balconies and all similar elements that are portions of a means of egress system and as such represent a significant safety concern if left in an unsafe condition. Should any of these elements of a means of egress system become structurally unsound, the building or portions thereof may be regarded as unsafe.

Item 6 addresses foundation systems. Foundation systems are essential to the structural integrity of any building. If any portion of any foundation system is not supported by adequate soil, is not plumb as intended to distribute the loads, has cracks or breaks or is inadequately anchored, the building may be regarded as unsafe.

Exceptions:

1. Recognize that a qualified entity could substantiate an alternative method or material that meets the purpose and intent of the code. This alternative would need to be approved by the code official. An engineering study that substantiates the structural integrity in a rational analysis may be the basis for accepting a contention that the building is not unsafe.
2. Allows a building owner the option of demolition of an unsafe condition subject to the code official's approval. If the building or structure or portion thereof is demolished, and does not exist, the condition is considered to be resolved.



Interior Structure

STRUCTURAL MEMBERS

Code Text

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

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Improper original construction, unapproved additions and repairs, water damage, deferred maintenance and overloading of structural members will result in structural damage and failure.

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. Areas of concern include the bottom of columns, the outside ends of beams and joists, flooring under bathrooms and kitchens and the underside of roofs. Check all of these 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, and furniture, equipment and occupants on the inside. As equipment wears out or malfunctions, it needs to be repaired or replaced.

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.

ADDITIONAL CONSIDERATIONS

Can be caused by improper original construction, unapproved or unauthorized additions and repairs, water damage, lack of repairs and overloading. Hoarding can cause structural members to fail.

- Undersized structural member can sag, crack or collapse
- Inadequate fastening
- Poor quality construction
- Excessive notching, notches in the wrong place



Interior Structure

INTERIOR SURFACES

Code Text

Interior surfaces, including windows and doors, shall be maintained in good, clean and sanitary condition. Peeling, chipping, flaking or abraded paint shall be repaired, removed or covered. Cracked or loose plaster, decayed wood and other defective surface conditions shall be corrected.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Interior surface damage is frequently the result of tenant abuse or water damage. Water damage results from leaking roofs, plumbing fixtures and water pipes, and also damaged or open windows and doors that permit rain to enter. Any damaged interior surfaces are required to be repaired and the cause of the damage must be corrected.

Interior surfaces that contain lead-based paint may present serious health hazards to occupants, especially children. Lead is a toxic heavy metal that enters the body by inhalation or ingestion of fine particulate. Lead affects many organs as well as the central nervous system, and is particularly toxic to young children because it retards brain and central nervous system development.

HUD estimates that three-quarters of the dwellings built before 1980 contain some lead-based paint. Because the amount of lead in paint was gradually reduced during the 30 years prior to its prohibition in general application in 1978 (lead-based paint is currently produced for specialized industrial applications), dwellings built before 1950 are more likely to contain lead-based paint and paint with higher concentrations of lead. HUD surveys show that 90 percent of dwellings built before 1940, 80 percent of dwellings built between 1940 and 1959 and 62 percent of dwellings built between 1960 and 1979 contain lead-based paint. Lead-based paint is often found under newer layers of paint that is not lead based.

Intact lead-based paint is not an immediate hazard because the predominant route of lead poisoning is through ingestion or inhalation of fine lead particulate found in contaminated dust. The risk of poisoning becomes significant when lead-based paint contaminates dust through peeling, chipping, flaking and



abraded conditions identified in the code. Lead contamination may also be caused by lead-based paint that is disturbed during repair and remodeling activities such as scraping, sanding, drilling and cutting. Lead hazard control is achieved by removing lead-contaminated dust and eliminating the source of contamination. The determination of the type of activities (abatement, interim controls or repair) needed to correct hazardous conditions depends on the extent of paint deterioration and the occupancy. More protective measures should be taken if children under 6 years of age are likely to occupy the building because they are more sensitive to lead contamination. All activities that disturb lead-based paint can generate significant lead hazards. Precautions should be initiated to protect workers, occupants and the environment. Precautions include selection of procedures that minimize the creation of dust [such as wet sanding, wet scraping, power tools with high-efficiency particulate air (HEPA) filtered vacuum attachments and heat guns less than 1,100°F (593°C)]; containment of dust and debris; covering and securing horizontal surfaces, occupants' furniture and fixtures (if exterior work, the ground and plants) with polyethylene to prevent contamination; thorough cleaning with HEPA-filtered vacuum and detergent; and clearance testing to prove lead concentrations are below hazardous levels before occupancy.

Federal regulations recognize two levels of lead-specific hazard control measures—abatement and interim controls. Abatement is defined as measures designed to last more than 20 years, while less durable measures are considered interim controls. Environmental Protection Agency (EPA) regulations or state regulations approved by the EPA require workers and supervisors to be trained and certified to undertake activities specifically intended to abate or control lead-based paint hazards. The same activities that are undertaken as specific lead abatement or interim controls (demolition, paint removal, door or window replacement, etc.) may be undertaken by non-certified workers and supervisors if they are a part of general repair and remodeling activities.

More detailed information on lead hazard evaluation and control is available from state and local agencies, the National Lead Information Center (800-424-5323) sponsored by the EPA and the HUD Office of Lead Hazard Control. The code official can help protect public health and safety by coordinating code enforcement with enforcement of lead regulations and providing lead hazard awareness and hazard control information to contractors and property owners.

ADDITIONAL CONSIDERATIONS

If you encounter a situation where a large amount of lead-based paint must be abated, provide a copy of section 305.3 and the Commentary to the property owner.



Interior Structure

STAIRS AND WALKING SURFACES

Code Text

Every stair, ramp, landing, balcony, porch, deck or other walking surface shall be maintained in sound condition and good repair.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Handrails, treads and risers must be structurally sound, firmly attached to the structure and properly maintained to safely perform their intended functions. All parts of a stair also should be inspected, including stringers, risers, treads, balusters, guards and handrails, and also all walking surfaces such as floors, landings, decks or ramps.

ADDITIONAL CONSIDERATIONS

All parts of the stairs and walking surfaces should be inspected.



Interior Structure

HANDRAILS AND GUARDS

Code Text

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

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

This section provides for the safety and maintenance of handrails and guards. Although not mandated, loads for handrails and guards in the applicable building code can be considered the normally imposed loads.

ADDITIONAL CONSIDERATIONS

Use the normally imposed loads on these.



Interior Structure

INTERIOR DOORS

Code Text

Every interior door shall fit reasonably well within its frame and shall be capable of being opened and closed by being properly and securely attached to jambs, headers or tracks as intended by the manufacturer of the attachment hardware.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

The ability of a door to function as the manufacturer intended is one of the key elements in being able to properly exit a building. In addition to contributing to building egress, doors are also key elements in providing for security and privacy; therefore, all interior doors should be kept in a state of repair that will allow them to function effectively.



Component Serviceability

GENERAL AND UNSAFE CONDITIONS

Code Text

Every interior door shall fit reasonably well within its frame and shall be capable of being opened and closed by being properly and securely attached to jambs, headers or tracks as intended by the manufacturer of the attachment hardware.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

306 General.

The components of a structure and equipment therein shall be maintained in good repair, structurally sound and in a sanitary condition.

306.1.1 Unsafe conditions.

Where any of the following conditions cause the component or system to be beyond its limit state, the component or system shall be determined as unsafe and shall be repaired or replaced to comply with the International Building Code or the International Existing Building Code as required for existing buildings:

1. Soils that have been subjected to any of the following conditions:
 - 1.1. Collapse of footing or foundation system;
 - 1.2. Damage to footing, foundation, concrete or other structural element due to soil expansion;
 - 1.3. Adverse effects to the design strength of footing, foundation, concrete or other structural element due to a chemical reaction from the soil;
 - 1.4. Inadequate soil as determined by a geotechnical investigation;
 - 1.5. Where the allowable bearing capacity of the soil is in doubt; or
 - 1.6. Adverse effects to the footing, foundation, concrete or other structural element due to the ground water table.
2. Concrete that has been subjected to any of the following conditions:
 - 2.1. Deterioration;



- 2.2. Ultimate deformation;
 - 2.3. Fractures;
 - 2.4. Fissures;
 - 2.5. Spalling;
 - 2.6. Exposed reinforcement; or
 - 2.7. Detached, dislodged or failing connections.
3. Aluminum that has been subjected to any of the following conditions:
 - 3.1. Deterioration;
 - 3.2. Corrosion;
 - 3.3. Elastic deformation;
 - 3.4. Ultimate deformation;
 - 3.5. Stress or strain cracks;
 - 3.6. Joint fatigue; or
 - 3.7. Detached, dislodged or failing connections.
 4. Masonry that has been subjected to any of the following conditions:
 - 4.1. Deterioration;
 - 4.2. Ultimate deformation;
 - 4.3. Fractures in masonry or mortar joints;
 - 4.4. Fissures in masonry or mortar joints;
 - 4.5. Spalling;
 - 4.6. Exposed reinforcement; or
 - 4.7. Detached, dislodged or failing connections.
 5. Steel that has been subjected to any of the following conditions:
 - 5.1. Deterioration;
 - 5.2. Elastic deformation;
 - 5.3. Ultimate deformation;
 - 5.4. Metal fatigue; or
 - 5.5. Detached, dislodged or failing connections.
 6. Wood that has been subjected to any of the following conditions:
 - 6.1. Ultimate deformation;
 - 6.2. Deterioration;
 - 6.3. Damage from insects, rodents and other vermin;
 - 6.4. Fire damage beyond charring;
 - 6.5. Significant splits and checks;
 - 6.6. Horizontal shear cracks;
 - 6.7. Vertical shear cracks;
 - 6.8. Inadequate support;
 - 6.9. Detached, dislodged or failing connections; or
 - 6.10. Excessive cutting and notching.

Exceptions:



1. Where substantiated otherwise by an approved method.
2. Demolition of unsafe conditions shall be permitted where approved by the code official.

ADDITIONAL CONSIDERATIONS

Use In order to analyze all of the elements of a building, this section ensures that each component of a building must meet its intended purpose or the building (or portion thereof) can be regarded as unsafe. This provision specifies that each material (such as soil, concrete, masonry, wood, steel, etc.) used to create a building or structure must continue to be viable.

Item 1 delineates some conditions of soil or foundation stability that denote unsafe conditions. Any of these allow the code official to determine that an unsafe condition exists.

Items 2 through 6 delineate some conditions that, if present in structural elements, are sufficient to determine that an unsafe condition exists.



Handrails and Guardrails

GENERAL

Code Text

Every exterior and interior flight of stairs having more than four risers shall have a handrail on one side of the stair and every open portion of a stair, landing, balcony, porch, deck, ramp or other walking surface that is more than 30 inches (762 mm) above the floor or grade below shall have guards. Handrails shall be not less than 30 inches (762 mm) in height or more than 42 inches (1067 mm) in height measured vertically above the nosing of the tread or above the finished floor of the landing or walking surfaces. Guards shall be not less than 30 inches (762 mm) in height above the floor of the landing, balcony, porch, deck, or ramp or other walking surface.

Exception:

Guards shall not be required where exempted by the adopted building code.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Note that this section does not discuss maintenance requirements for handrails and guards. It contains requirements for handrail and guard installations at specific locations in all existing buildings. If these locations are present at an existing building, then the minimum handrail and guard requirements are mandated. Handrails are required on at least one side of all means of egress stairs more than four risers in height. Handrails can neither be less than 30 inches (762 mm) nor more than 42 inches (1067 mm) above the nosing of the tread (see Commentary Figure 307.1).

Guards are required on the open side of all uneven walking surfaces greater than 30 inches (762 mm) in height that include stairs, landings, balconies, porches, decks or ramps. The guard must be at least 30 inches (762 mm) above the floor in all cases. Guards are to contain intermediate rails, balusters or other construction to reduce the chance of an adult or child from falling through the guard. If the guard is missing some intermediate rails or balustrades, it is recommended that it be repaired to its original condition if it will provide protection equivalent to that when originally constructed.



The exception refers to the building code currently adopted by the jurisdiction. If the current adopted building code would not require a guard for a particular location in a new building, then a guard would not be required in accordance with this exception.

ADDITIONAL CONSIDERATIONS

Guards must be at least 30 inches above the finished floor. Balusters should meet the requirements of the IRC/IBC - 4" spacing O.C.



Rubbish and Garbage

ACCUMULATION OF RUBBISH OR GARBAGE

Code Text

Exterior property and premises, and the interior of every structure, shall be free from any accumulation of rubbish or garbage.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Insanitary houses are found in almost every community. The code official may frequently find conditions where occupants fail to properly store and remove their garbage and refuse. Occasionally, the conditions may be so bad that he or she must condemn the structure as unfit for human occupancy in accordance with Section 108.1.3. Emotional, physical and mental problems may be contributing factors. The code official may have to work with health officials, social workers, child protection workers and a host of other social service agencies to obtain a solution to the problem.

Improperly stored garbage and rubbish in public halls and stairways may result in insect and rodent infestations, trip hazards and accidental fires. More importantly, improper storage creates a hazard when the exit must be used in an emergency, such as a fire.

ADDITIONAL CONSIDERATIONS

Applies to the interior of the home, apartment unit or common areas in apartment buildings as well as the exterior of any property.



Rubbish and Garbage

DISPOSAL OF RUBBISH

Code Text

Every occupant of a structure shall dispose of all rubbish in a clean and sanitary manner by placing such rubbish in approved containers.

308.2.1 Rubbish Storage Facility

The owner of every occupied premises shall supply approved covered containers for rubbish, and the owner of the premises shall be responsible for the removal of rubbish.

308.2.2 Refrigerators

Refrigerators and similar equipment not in operation shall not be discarded, abandoned or stored on premises without first removing the doors.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Rubbish includes all waste materials except garbage. Occupants are responsible for disposing of their own rubbish in proper containers. Three frequent causes for improper rubbish disposal are:

- The occupants are careless—rubbish is stacked and stored in a haphazard fashion.
- Insufficient containers are provided to handle rubbish.
- The rubbish is not being picked up frequently enough to eliminate the volume being created.

The code official should work with occupants and owners to determine the cause of the problem and then order the owners or occupants to take the appropriate action to resolve it.

308.2.1 Rubbish Storage Facility

The owner is responsible for the removal of all rubbish. This provision is helpful as an enforcement tool. It eliminates confusion as to whether the tenant, the operator or the owner is responsible.



308.2.2 Refrigerators

Discarded refrigerators pose an attractive nuisance to children. Children often climb into the refrigerator and close the door afterward to create a hiding place. Due to the risk of suffocation from being trapped in the refrigerator, the doors must be removed before it is considered safe to keep it during periods of storage or to properly dispose of the unit.

ADDITIONAL CONSIDERATIONS

What is rubbish?

All material waste except garbage.

What is garbage?

The animal or vegetable waste resulting from handling, preparation, cooking and consumption of food.

Causes of improper rubbish disposal

- Carelessness
- No containers or insufficient containers provided
- Infrequent collection

The owner is responsible for the removal of all rubbish. This provision is helpful as an enforcement tool. It eliminates confusion as to whether the tenant, the operator or the owner is responsible.

308.2.1 Rubbish Storage Facility

Solely the owner's responsibility for removal of rubbish from the property.

308.2.2 Refrigerators

Storage of refrigerators with the doors still attached is a crime according to the PA Crimes Code. Section 6502 of the Pennsylvania Crimes Code specifies a summary offense is committed for this violation. Call the local Police Department for assistance when the property owner or tenant is not immediately responsive. Listed below is the text of Section 6502. Please feel free to provide it to local law enforcement if they are not familiar with it as many officers have never dealt with an improperly stored refrigerator and do not know they have the authority and/or responsibility to deal with it.



Section 6502 - PA Crimes Code.

Refrigerators and ice boxes

1. Offense defined -- A person is guilty of a summary offense if he discards or abandons in any place accessible to children any refrigerator or icebox having a capacity of 1.5 cubic feet or more with an attached lid or door, or being the owner, lessee or manager of any place accessible to children knowingly permits an abandoned or discarded refrigerator, icebox, or chest to remain there with an attached lid or door.
2. Effect of violation -- A violation of this section shall not in itself render a person guilty of manslaughter, assault or other crime against a person who may suffer death or injury from entrapment in an icebox or refrigerator.



Rubbish and Garbage

DISPOSAL OF GARBAGE

Code Text

The owner of every occupied premises shall supply approved covered containers for rubbish, and the owner of the premises shall be responsible for the removal of rubbish.

Code 308.3.1 Garbage Facilities

The owner of every dwelling shall supply one of the following: an approved mechanical food waste grinder in each dwelling unit; an approved incinerator unit in the structure available to the occupants in each dwelling unit; or an approved leakproof, covered, outside garbage container.

Code 308.3.2 Containers

The operator of every establishment producing garbage shall provide, and at all times cause to be utilized, approved leakproof containers provided with close-fitting covers for the storage of such materials until removed from the premises for disposal.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Garbage is the animal and vegetable waste created from the preparation and consumption of food. Occupants are responsible for properly disposing of their garbage by either using a garbage disposal (if available) or by placing the waste in approved garbage storage containers. Improper disposal of garbage can attract rodents, insects, animals and vermin, produce noxious odors and create potential health problems. Similar to rubbish disposal, garbage disposal problems can be the result of:

- Careless disposal (not properly wrapped or stored) by the occupants.
- Insufficient containers to handle the regular amount of garbage.
- Garbage not being picked up frequently enough.
- The mechanical garbage disposal is not operating.



The health consequences to the occupants and the neighborhood are probably more severe with garbage than rubbish; therefore, the code official must promptly order the correction of this problem and require an ongoing program of garbage disposal.

Code 308.3.1

The owner of any dwelling must provide a mechanical garbage disposal, an approved incinerator or enough containers to hold all garbage produced.

The storage of garbage in plastic bags is not allowed. Animals, rodents and vermin can easily open such bags and spread the garbage stored in them. Garbage containers are to be placed outside of the dwelling unit and be constructed of material that is resistant to animals and rodents. The garbage containers are to be covered with lids.

Code 308.3.2

The operators of restaurants and similar establishments that produce garbage are required to provide sufficient numbers of containers to store the garbage properly until such time that it is removed from the premises.

Improper storage of animal and vegetable wastes produces noxious odors and permits rodents and other vermin access to the garbage. It also creates potential health problems.

ADDITIONAL CONSIDERATIONS

The term approved means "Acceptable to the Code Official". Many Code Officials have difficulty enforcing sections of the code that list things as "approved". These items fall under the Code Official's discretion.

Causes of improper garbage disposal:

- Careless disposal by occupants
- Insufficient containers to handle the amount of garbage
- Infrequent collection
- Garbage disposals not operating properly

Code 308.3.1

The storage of garbage in plastic bags is not permitted. Garbage cans must be located outside of the dwelling unit. Garbage cans must be made of a rodent proof material and must have a lid.





Pest

INFESTATION

Code Text

Structures shall be kept free from insect and rodent infestation. Structures in which insects or rodents are found shall be promptly exterminated by approved processes that will not be injurious to human health. After pest elimination, proper precautions shall be taken to prevent reinfestation.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

There are two basic types of insect infestations: nuisance and wood destroying. Nuisance insects include flies, fleas, bees, cockroaches and silverfish. Wood-destroying insects include termites, powderpost beetles and carpenter ants.

Nuisance insects are usually found near food sources and in damp areas.

Wood-destroying insects are sometimes difficult to find. The code official or a professional exterminator may probe wood members for evidence of infestation. Concrete in contact with the soil should be visually checked for evidence of termite tubes leading from the soil to wood members. Wood infested with powderpost beetles frequently has the appearance of having been penetrated by shotgun pellets. A large powderpost beetle infestation leaves many small holes in the wood. Additionally, active beetles leave a fine wood powder called "frass" on the wood.

Eliminating nuisance insects may require treating the building with insect spray on a regular basis. Eliminating wood-destroying insects may require poisoning the soil around the building. Severe insect infestations may necessitate replacement of structural members. Evidence of a rodent infestation can include droppings, gnaw marks and oily rub stains (imprints left where the rodent's body rubbed against the structure). Such infestations should be ordered exterminated. Additionally, corrective measures must be taken to reduce the possibility of a reinfestation.



ADDITIONAL CONSIDERATIONS

Eradicate the infestation and require repairs of all damage caused by the infestation and any areas where insects and rodents can enter.



Pest Elimination

OWNER

Code Text

The owner of any structure shall be responsible for pest elimination within the structure prior to renting or leasing the structure.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

The owner must eliminate all rodents and insects before a building or portion of a building can be rented or leased. Although it would appear easy to enforce this provision, the reality is that a new occupant may not notice any insect or rodent problems until after the building has been occupied. It may be difficult and even impossible to determine if an infestation existed before the new occupants moved in. One practical way to resolve this problem is to require the owner to have the building inspected for infestations before occupancy.

ADDITIONAL CONSIDERATIONS

IPMC suggests requiring having buildings professionally inspected for infestations prior to occupancy. You can also enforce after occupancy if a tenant invites you on the property.



Pest Elimination

SINGLE OCCUPANT

Code Text

The occupant of a one-family dwelling or of a single-tenant nonresidential structure shall be responsible for pest elimination on the premises.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

In a single-family dwelling or a single-tenant nonresidential unit, the occupant of the unit—not the owner—is responsible for maintaining the property free of infestation. Accordingly, the code official should cite the occupant for rodent or insect infestations.

ADDITIONAL CONSIDERATIONS

The occupant, not the owner is responsible for keeping the properties free of infestations, not the owner. The occupant should be cited.



Pest Elimination

MULTIPLE OCCUPANCY

Code Text

The owner of a structure containing two or more dwelling units, a multiple occupancy, a rooming house or a nonresidential structure shall be responsible for pest elimination in the public or shared areas of the structure and exterior property. If infestation is caused by failure of an occupant to prevent such infestation in the area occupied, the occupant and owner shall be responsible for pest elimination.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

The owners of public or shared areas in multi-unit residential and nonresidential buildings must eliminate rodents and insects from the public or shared areas of the structure and exterior property. If a single unit in one of these buildings is infested, it is the owner and occupant responsibility to provide for the extermination.

ADDITIONAL CONSIDERATIONS

Owner is responsible for the public areas. If a single unit is infested, it is the owner and tenant responsibility to exterminate. Both the owner and occupant of the infested unit can be cited.



Pest Elimination

OCCUPANT

Code Text

The occupant of any structure shall be responsible for the continued rodent- and pest-free condition of the structure.

Exception:

Where the infestations are caused by defects in the structure, the owner shall be responsible for pest elimination.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Occupants must maintain their units in a clean and sanitary manner, free of rodents. If the occupants fail to maintain their unit, then they are responsible for all pest elimination costs.

From a practical point of view, this section is difficult to enforce. Occupants who are going to be charged pest elimination fees may move out before paying such a fee. Unfortunately, once the unit is vacant the owner becomes responsible for the pest elimination. Because the owner is responsible for correcting any defects in the structure (see Section 301.2), he or she is then responsible for any infestation caused by these defects.

ADDITIONAL CONSIDERATIONS

If the building is structurally deficient, then the owner is responsible for the infestation and abatement. Although the IPMC specifies responsibility for rodent infestation and abatement, you can cite the appropriate parties. However, it is not your concern who actually pays to abate the problem.



General

SCOPE

Code Text

The provisions of this chapter shall govern the minimum conditions and standards for light, ventilation and space for occupying a structure.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Buildings must comply with minimum criteria and conditions for light, ventilation and space. Specific requirements are outlined in this chapter.

ADDITIONAL CONSIDERATIONS

All repairs and additions to plumbing systems must be permitted and inspected by the Allegheny County Health Department. Require a copy of the County Inspection report prior to issuance of any Certificate of Occupancy. International Plumbing Code does not apply in Allegheny County. This section applies to interior plumbing, sanitary sewer lateral and storm sewer lateral if it is connected into a storm collection system. Allegheny County Plumbing Code is 78 pages. Don't bother trying to learn it or interpret it as the County may have a different interpretation. Instruct property owner to contact ACHD Plumbing Division directly. Contact information is 412-578-8036. Website: www.achd.net/plumbing/



General

RESPONSIBILITY

Code Text

The owner of the structure shall provide and maintain light, ventilation and space conditions in compliance with these requirements. A person shall not occupy as owner-occupant, or permit another person to occupy, any premises that do not comply with the requirements of this chapter.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

The owner is responsible for complying with all light, ventilation and space requirements established in this chapter. A non-complying structure cannot be occupied until it is brought into compliance with the criteria.



General

ALTERNATIVE DEVICES

Code Text

In lieu of the means for natural light and ventilation herein prescribed, artificial light or mechanical ventilation complying with the International Building Code shall be permitted.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Light and ventilation by artificial methods are permitted, such as electric lighting instead of natural light and mechanical ventilation instead of natural ventilation. Electric lighting is permitted to replace the natural light requirements of Section 402. Mechanical ventilation is permitted to replace the natural ventilation requirements of Section 403. Any alternative method approved by the code official must also comply with the installation and performance requirements of the building code.



Light

HABITABLE SPACES

Code Text

Every habitable space shall have not less than one window of approved size facing directly to the outdoors or to a court. The minimum total glazed area for every habitable space shall be 8 percent of the floor area of such room. Wherever walls or other portions of a structure face a window of any room and such obstructions are located less than 3 feet (914 mm) from the window and extend to a level above that of the ceiling of the room, such window shall not be deemed to face directly to the outdoors nor to a court and shall not be included as contributing to the required minimum total window area for the room.

Exception:

Where natural light for rooms or spaces without exterior glazing areas is provided through an adjoining room, the unobstructed opening to the adjoining room shall be not less than 8 percent of the floor area of the interior room or space, but a minimum of 25 square feet (2.33 sq. meters). The exterior glazing area shall be based on the total floor area being served.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Habitable spaces are those spaces that are normally considered “inhabited” in the course of residential living and provide the four basic characteristics of living, sleeping, eating and cooking. Other spaces, such as halls or utility rooms, are not considered habitable, but would in many instances be considered occupiable.

As stated in Section 401.3, the natural lighting requirements of this section are not required if artificial light is provided. Electric lighting is almost always provided. Where electric lighting is provided instead of natural lighting, the code official must rely on a light meter to assess whether the illumination provided meets the criteria in the referenced building code.

All habitable spaces must have one or more windows and the total glazed area must equal at least 8 percent of the floor area of the room served [see Commentary Figure 402.1(1)].



Windows must face directly to the outdoors or to a court. Any window that faces a wall or other obstruction that is less than 3 feet from the window and higher than the ceiling of the room cannot be included in calculating the minimum total window area needed for the room it serves [see Commentary Figure 402.1(2)].

The exception addresses a case where a space (or room) has no glazed area open to the required courts or yards but is adjacent to one that does. The interior room may “borrow” natural lighting from the adjacent space if the opening in the wall between the two spaces is at least 8 percent of the floor area of the interior room but not less than 25 square feet. The required glazed area facing the required court or yard is to be based on the total floor area of all rooms served [see Commentary Figure 402.1(3)].

In Commentary Figure 402.1(3), the glazed area opening onto a court or yard in the space provided with the openings must be greater than 8 percent of the total floor areas served; therefore, in Commentary Figure 402.1(3), the glazed area in Space B is required to be equal to or greater than 0.08 (floor area of Space A + floor area of Space B).

The next step is to require the opening between the adjacent spaces to be a minimum of 25 square feet, but not less than 0.08 multiplied by the floor area of Space A.

ADDITIONAL CONSIDERATIONS

Opening between the two rooms must be a minimum of 8% of the floor area or 25 square feet. The 25 square feet will suffice for most since 25 square feet would be 8% of 312.5 square feet, which is a rather large room. This is difficult to enforce since there may be major structural improvements required for compliance. Interior modifications may work best to share the light through an adjacent room. If windows are covered with an opaque material or other surfacing for privacy, require the removal of the substance on the window.



Light

COMMON HALLS AND STAIRWAYS

Code Text

Every common hall and stairway in residential occupancies, other than in one- and two-family dwellings, shall be lighted at all times with not less than a 60-watt standard incandescent light bulb for each 200 square feet (19 m²) of floor area or equivalent illumination, provided that the spacing between lights shall not be greater than 30 feet (9144 mm). In other than residential occupancies, means of egress, including exterior means of egress, stairways shall be illuminated at all times the building space served by the means of egress is occupied with not less than 1 footcandle (11 lux) at floors, landings and treads.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

The intent of this section is to establish a minimum level of lighting in common halls and stairs of residential occupancies, such as apartment buildings. Adequate lighting in hallways and stairs is essential for safe exiting in a fire emergency, reduces the chance of injury due to falls during normal use and helps deter crime.

This section contains a prescriptive requirement [60-watt light bulbs for every 200 square feet] for ease of application and enforcement (see Commentary Figure 402.2). It assumes a typical ceiling height of no more than 10 feet. Equivalent illumination by means other than 60-watt incandescent bulbs is explicitly permitted, and the code official would establish equivalency by judgment or by actually measuring with a light meter. This lighting is required to be provided at all times, since residential buildings are typically occupied at all times.

In all occupancy groups other than residential, a lower, minimum level of lighting [1 footcandle (11 lux)] is required at all times when the building is occupied. The [1 footcandle (11 lux)] threshold is consistent with the International Fire Code® (IFC®) and the International Building Code® (IBC®) for acceptable lighting in means of egress components.



ADDITIONAL CONSIDERATIONS

Residential buildings are typically always occupied, so the lights must always function. Incandescent bulbs can be replaced by different types of bulbs as long as light output is the same.



Light

OTHER SPACES

Code Text

All other spaces shall be provided with natural or artificial light sufficient to permit the maintenance of sanitary conditions, and the safe occupancy of the space and utilization of the appliances, equipment and fixtures.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

No specific criteria for minimum light and ventilation are established for other spaces, such as storage and utility rooms, closets and mud rooms. All spaces, however, must have enough light to maintain their cleanliness and to allow for the safe use of appliances, equipment and fixtures located within them.

ADDITIONAL CONSIDERATIONS

Residential buildings are typically always occupied, so the lights must always function. Incandescent bulbs can be replaced by different types of bulbs as long as light output is the same.



Ventilation

HABITABLE SPACES

Code Text

Every habitable space shall have not less than one operable window. The total operable area of the window in every room shall be equal to not less than 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 not less than 8 percent of the floor area of the interior room or space, but not less than 25 square feet (2.33 sq.meters). The ventilation openings to the outdoors shall be based on a total floor area being ventilated.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

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 403.1 (see the definition of “Operable area” in Chapter 2). The operable area should be measured when the window or door is in its full, open position. When determining operable area, only the space between stops or between stops and sash is to be measured. The area of sashes, meeting rails, mullions and muntins is to be deducted (see Commentary 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.



ADDITIONAL CONSIDERATIONS

Sleeping rooms do not qualify for this exception as they typically do not have an unobstructed opening to an adjacent room. Property owners may opt to use mechanical ventilation in lieu of natural ventilation for a captive room such as a kitchen.



Ventilation

BATHROOMS AND TOILET ROOMS

Code Text

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.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

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 is required to exhaust moisture-laden air to the exterior. The vent must not terminate in any attic or other closed space (see Commentary Figure 403.2), which would allow moisture to condense on the building structure and lead to deterioration of the structure.

ADDITIONAL CONSIDERATIONS

If the bathroom or toilet room has a window, the openable area must meet the requirements of 8% of the floor area of the room and 45% of the window must open. Cannot use air from an adjacent room. Purpose of the mechanical vent is for moisture only; not odor. No specifications on the size of output of the vent in the IPMC.



Ventilation

COOKING FACILITIES

Code Text

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.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

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 approvals 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.



Ventilation

PROCESS VENTILATION

Code Text

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.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

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.

ADDITIONAL CONSIDERATIONS

Welding, painting, sandblasting, etc. If any process created potentially hazardous fumes, gases or dust it must be exhausted directly from the source to the outside and must comply with the International Mechanical Code. Municipal BCO shall issue a permit for this installation.



Ventilation

CLOTHES DRYER EXHAUST

Code Text

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

Exception:

Listed and labeled condensing (ductless) clothes dryers.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

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. The exception recognizes condensing ductless clothes dryers. Typically, in a condenser dryer, there are two separate loops. The inside loop of air that is sealed from the outside loop of environment air from within the drum is heated, then blown through the tumbling clothes, then the moisture-laden air is passed through a heat exchanger, where the water recondenses. The same dry air is then reheated, where it is again blown through the drum and clothes, and the cycle begins again.

The outside loop in a condenser dryer consists of either air or water. Some condenser dryer models are air-cooled, and use the ambient room air as a heat sink by blowing it across the outside of the heat exchanger. These dryers will tend to heat the indoor air in one's laundry room significantly. Note, however, that only heat is released, and all moisture is contained within the unit. The condensed water can be either pumped away to a drain line or stored in a container within the dryer to be emptied later.



ADDITIONAL CONSIDERATIONS

- Confirm that a dryer vent is securely connected. Cannot exhaust into any other system. All dryer exhaust ducts shall terminate on the outside of the building, not less than 3 feet from any opening to the building (window, door).
- Shall have a backdraft damper with no screen.
- Minimum 4" diameter, constructed of metal, with a smooth interior. No accordion pipes.
- Shall be supported every 4 feet and secured in place.
- Shall be properly overlapped. Insert end into the next piece. No screws or rivets that can catch lint of the inside.
- If the duct work is hidden, the length of the exhaust duct shall be labeled somewhere within 6 feet of the duct.
- If no dryer is present the duct should be capped to prevent rodent infestation.

Maximum length of any duct is 25 feet unless manufacturer specifies a shorter length. Every joint reduces to the maximum length. Every 45-degree angle reduces the maximum length by 2.5 feet. Every 90-degree angle reduces the maximum length by 5 feet.



Occupancy Limitation

PRIVACY

Code Text

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

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

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.



Occupancy Limitation

MINIMUM ROOM WIDTHS

Code Text

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

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

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 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.



Occupancy Limitation

MINIMUM CEILING HEIGHTS

Code Text

Habitable spaces, hallways, corridors, laundry areas, bathrooms, toilet rooms and habitable basement areas shall have a minimum clear ceiling height of 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 a maximum of 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 minimum ceiling height of 6 feet 8 inches (2033 mm) with a minimum clear height of 6 feet 4 inches (1932 mm) 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 minimum clear ceiling height of 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 minimum clear ceiling height of 5 feet (1524 mm) shall be included.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

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 1.5-story houses that have the sloped attic area finished into bedrooms and similar uses. Similar to the previous exception, the 7-foot-high 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 portion may be less than one-third of the room's actual floor area.

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



Occupancy Limitations

BEDROOM AND LIVING ROOM REQUIREMENTS

Code Text

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

404.4.1 Room area.

Every living room shall contain not less than 120 square feet (11.2 m²) and every bedroom shall contain not less than 70 square feet (6.5 m²) and every bedroom occupied by more than one person shall contain not less than 50 square feet (4.6 m²) of floor area for each occupant thereof.

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.

404.4.3 Water closet accessibility.

Every bedroom shall have access to not less than one water closet and one lavatory without passing through another bedroom. Every bedroom in a dwelling unit shall have access to not less than one water closet and lavatory located in the same story as the bedroom or an adjacent story.

404.4.4 Prohibited occupancy.

Kitchens and non-habitable spaces shall not be used for sleeping purposes.

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 water-heating 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

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

404.4

The size of bedrooms and living rooms in a dwelling unit are determining factors 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

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). The smallest bedroom allowed is 70 square feet (6.5 m²). This is barely enough space for a regular-sized (twin) bed and dresser. If a bedroom is intended to accommodate more than one person, the room must have at least 50 square feet (4.6 m²) per person. A sleeping room for two people must contain at least 100 square feet (9.3 m²), for three, 150 square feet (13.9 m²) and so on. Inadequate sleeping space may increase the spread of communicable diseases, reduce privacy and provide insufficient space for clothes, furniture and other personal belongings. See the commentary to Section 404.5 for examples of the application of the requirements of this section.

404.4.2

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 Commentary Figure 404.4.2). Additionally, dwelling units must be configured such that occupants can egress from any habitable room in the dwelling unit without passing through a bedroom. 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

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

The code prohibits kitchens, interior public areas and non-habitable 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

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
- Section 704 for required smoke detectors in the vicinity of the bedrooms



Occupancy Limitation

OVERCROWDING

Code Text

Dwelling units shall not be occupied by more occupants than permitted by the minimum area requirements of Table 404.5.

404.5.1 Sleeping area.

The minimum occupancy area required by Table 404.5 shall not be included as a sleeping area in determining the minimum occupancy area for sleeping purposes. Sleeping areas shall comply with Section 404.4.

404.5.2 Combined spaces.

Combined living room and dining room spaces shall comply with the requirements of Table 404.5 if the total area is equal to that required for separate rooms and if the space is located so as to function as a combination living room/dining room.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

404.5

Overcrowding is often a problem in rental properties and in small, single-family dwellings. It 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.

The code requires all types of dwelling units to comply with occupancy 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 valuable 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 evening hours in order to find an adult occupant at home. School enrollment records can also provide information on overcrowding. Some communities have laws requiring an occupancy permit to be issued before a dwelling unit can be occupied. This allows the number of occupants shown on the application to be checked against the maximum occupancy of the dwelling unit as determined by an inspection [see Commentary Figure 404.5(1)].

Some floor plan arrangements would allow the dining and living room areas to be considered as combined dining/living/sleeping rooms. To illustrate the alternative analytical approach for the maximum number of occupants, consider the following example in which two analyses will be made: the first assumes only the three bedrooms are used for sleeping purposes; the second assumes the living/dining area is to be counted as providing sleeping space [see Commentary Figure 404.5(2) for an example of an arrangement where the access to the kitchen is not through the dining/living room]. The requirement of Section 404.4.2, therefore, would be met and the maximum occupant load would be the highest of the following two analyses.

404.5.1

The purpose of this section is to prohibit the dual use of dining rooms and living rooms as sleeping rooms, unless they are of sufficient size to incorporate the minimum required space for sleeping, in addition to the minimum required space for the dining or living room areas listed in Table 404.5. For example, if a dwelling is occupied by five people and one person is using the living room as a sleeping area, the minimum required size of the living room would be 190 square feet. This is based on 120 square feet for the living room, in accordance with Table 404.5, and 70 square feet for the single-occupant sleeping area, in accordance with Section 404.4.1.

The code does not prohibit a living or dining room from serving a dual purpose as a sleeping area; however, the room must be sized to accommodate both functions. See the commentary to Section 404.5 for additional examples of calculating the maximum allowable occupant load in dwellings where certain rooms are used for dual purposes.

404.5.2

When a living room and a dining room are combined into one room, the combined area must equal the sum of the minimum required area of each separate room established by Table 404.5. See Analysis 2 in the commentary to Section 404.5 for further illustration.



Occupancy Limitation

EFFICIENCY UNIT

Code Text

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

- A unit occupied by not more than one occupant shall have a minimum clear floor area of 120 square feet (11.2 m²). A unit occupied by not more than two occupants shall have a minimum clear floor area of 220 square feet (20.4 m²). A unit occupied by three occupants shall have a minimum clear floor area of 320 square feet (29.7 m²). These required areas shall be exclusive of the areas required by Items 2 and 3.
- The unit shall be provided with a kitchen sink, cooking appliance and refrigeration facilities, each having a minimum clear working space of 30 inches (762 mm) in front. Light and ventilation conforming to this code shall be provided.
- The unit shall be provided with a separate bathroom containing a water closet, lavatory and bathtub or shower.
- The maximum number of occupants shall be three.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

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 (at minimum) a sink, cooking appliance and refrigerator. It further requires that each of these have a 30-inch 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 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. Having enough space for the required fixtures, appliances and working spaces is considered sufficient to provide functional floor area.



Occupancy Limitation

FOOD PREPARATION

Code Text

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.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

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.



General

SCOPE

Code Text

The provisions of this chapter shall govern the minimum plumbing systems, facilities and plumbing fixtures to be provided.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Buildings must comply with the minimum criteria for the provisions of plumbing systems, facilities and fixtures established by this chapter. Any structure that does not conform to these criteria is in violation of the code and is subject to all penalties established by the jurisdiction as indicated in Section 106.

ADDITIONAL CONSIDERATIONS

All repairs and additions to plumbing systems must be permitted and inspected by the Allegheny County Health Department. Require a copy of the County Inspection report prior to issuance of any Certificate of Occupancy. International Plumbing Code does not apply in Allegheny County. Applies to interior plumbing, sanitary sewer lateral and storm sewer lateral if it is connected into a storm collection system. Allegheny County Plumbing Code is 78 pages. Don't bother trying to learn it or interpret it as the County may have a different interpretation. Instruct property owner to contact ACHD Plumbing Division directly. Contact information is 412-578-8036. Website: www.achd.net/plumbing/



General

RESPONSIBILITY

Code Text

The owner of the structure shall provide and maintain such plumbing facilities and plumbing fixtures in compliance with these requirements. A person shall not occupy as owner-occupant or permit another person to occupy any structure or premises that does not comply with the requirements of this chapter.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

The owner is responsible for complying with the requirements of this chapter. A structure must not be occupied if the plumbing systems or facilities do not conform to the minimum code requirements.



Required Facilities

DWELLING UNITS

Code Text

Every dwelling unit shall contain its own bathtub or shower, lavatory, water closet and kitchen sink that 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.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

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.



Required Facilities

ROOMING HOUSES

Code Text

Not less than one water closet, lavatory and bathtub or shower shall be supplied for each four rooming units.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Rooming houses with shared bathroom and toilet facilities must conform to the following minimum number of fixtures: one water closet, one lavatory and one bathtub or shower (i.e., one bathroom group) for each four rooming units, or portion thereof.

For example, a house with 22 rooming units requires at least six bathroom groups of plumbing fixtures ($22 \div 4 = 5.5$; rounded up to 6).



Required Facilities

HOTELS

Code Text

Where private water closets, lavatories and baths are not provided, one water closet, one lavatory and one bathtub or shower having access from a public hallway shall be provided for each 10 occupants.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Hotels with guest rooms that share bathroom and toilet facilities must conform to the following minimum number of fixtures: one water closet, one lavatory and one bathtub or shower for each 10 occupants, or portion thereof.

For example, a hotel with 22 occupants requires a minimum of three water closets, three lavatories and three bathtubs or showers, or a combination of three bathtubs and showers ($22 \div 10 = 2.2$; rounded up to 3).



Required Facilities

EMPLOYEES' FACILITIES

Code Text

502.4 Employee's facilities

Not less than one water closet, one lavatory and one drinking facility shall be available to employees.

502.4.1 Drinking facilities

Drinking facilities shall be a drinking fountain, water cooler, bottled water cooler or disposable cups next to a sink or water dispenser. Drinking facilities shall not be located in toilet rooms or bathrooms.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

502.4

To provide employees with sufficient sanitary facilities, every place of employment is to have at least one water closet, one lavatory and one drinking facility. This is a minimum requirement that provides the employees with at least one toilet room for their use. Obviously, the number of employees working for a company will affect the adequacy of providing only one water closet and one hand sink. When economically and physically practical, the code official should encourage a place of employment to install the minimum number of plumbing facilities established in the IPC.

502.4.1

To reduce the potential of contaminating the water, drinking facilities must be separate from toilet rooms or bathrooms. Water shall be provided by a drinking fountain, water cooler, bottled water cooler or disposable cups located next to a sink or water dispenser.

The requirement for disposable cups should be monitored, as many diseases are transmitted through shared, unwashed or unsanitized eating and drinking utensils.



ADDITIONAL CONSIDERATIONS

When repairs are made to plumbing facilities and ACHD is involved, they may not accept a water cooler and disposable cups in lieu of a drinking fountain. They sometimes accept a water cooler as a long-term contract is proven. When ACHD is not involved, you must make sure that some type of drinking water provisions is in place. A water cooler and a contract for a minimum of one year showing the address of the property being served should be sufficient.



Required Facilities

PUBLIC TOILET FACILITIES

Code Text

Public toilet facilities shall be maintained in a safe, sanitary and working condition in accordance with the International Plumbing Code. Except for periodic maintenance or cleaning, public access and use shall be provided to the toilet facilities at all times during occupancy of the premises.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

The purposes of this section are to establish minimum maintenance provisions for public toilet facilities and to ensure the availability of these facilities to the public at all times the building is occupied.

ADDITIONAL CONSIDERATIONS

ACHD rules shall apply rather than IPC.



Toilet Rooms

PRIVACY

Code Text

Toilet rooms and bathrooms shall provide privacy and shall not constitute the only passageway to a hall or other space, or to the exterior. A door and interior locking device shall be provided for all common or shared bathrooms and toilet rooms in a multiple dwelling.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

To protect human dignity and modesty, all toilet rooms and bathrooms must afford privacy. Where toilet rooms or bathrooms are shared by building occupants in dormitories or boarding houses, there is to be a door and locking device either for each water closet compartment in a toilet room/bathroom or that controls access to the toilet room/bathroom.

Passage through bathrooms and toilet rooms to get other rooms, spaces, corridors or the exterior is inconvenient and could also jeopardize the means of egress because of locked doors, wet floors and obstructions.

ADDITIONAL CONSIDERATIONS

No locking mechanism required when the bathroom is contained within the living unit.



Toilet Rooms

LOCATION

Code Text

Toilet rooms and bathrooms serving hotel units, rooming units or dormitory units or housekeeping units, shall have access by traversing not more than one flight of stairs and shall have access from a common hall or passageway.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Occupants of hotel units, rooming units, dormitory units or housekeeping units should not have to travel beyond the next adjacent story or pass through another occupant's unit to gain access to a bathroom toilet facility. Convenient access to facilities is a necessity for their use and maintenance.

ADDITIONAL CONSIDERATIONS

No locking mechanism required when the bathroom is contained within the living unit.



Toilet Rooms

LOCATION OF EMPLOYEE TOILET FACILITIES

Code Text

Toilet facilities shall have access from within the employees' working area. The required toilet facilities shall be located not more than one story above or below the employees' working area and the path of travel to such facilities shall not exceed a distance of 500 feet (152 m). Employee facilities shall either be separate facilities or combined employee and public facilities.

Exception:

Facilities that are required for employees in storage structures or kiosks, which are located in adjacent structures under the same ownership, lease or control, shall not exceed a travel distance of 500 feet (152 m) from the employee's regular working area to the facilities.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Employers are required to provide toilet facilities for employees within the employee's regular work areas. Employees should not have to travel more than 500 feet (152 m) or beyond the next adjacent story to reach the toilet room.

Employee toilet facilities can be for employees' use only or they can share customer facilities. If toilet rooms are inconvenient or located too far from the work area, they create a physical hardship for employees.

This section does not require storage buildings and kiosks to contain toilet facilities, as long as there are toilet facilities in an adjacent building such that the distance from the work area to the toilet facilities does not exceed 500 feet (152 m). The building with the toilet facilities must be under the same ownership, lease or control as the storage area. Employers cannot expect their employees to depend upon neighborhood gas stations, stores or other businesses to provide access to toilet facilities.



ADDITIONAL CONSIDERATIONS

The IPMC makes no mention of the use of port-a-johns for permanent sanitary facilities. If a business owner requests to be permitted to use port-a-johns, refer them to the Allegheny County Health Department. Require written proof if the property owner claims ACHD said it was acceptable.



Toilet Rooms

FLOOR SURFACE

Code Text

In other than dwelling units, every toilet room floor shall be maintained to be a smooth, hard, nonabsorbent surface to permit such floor to be easily kept in a clean and sanitary condition.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

A toilet room floor is much easier to maintain if the surface is smooth, hard and nonabsorbent. In areas such as toilet rooms where the public is likely to enter a facility, the primary concern remains keeping the floor area as clean as possible to safeguard against the spread of disease.



Plumbing Systems and Fixtures

GENERAL

Code Text

Plumbing fixtures shall be properly installed and maintained in working order, and shall be kept free from obstructions, leaks and defects and be capable of performing the function for which such plumbing fixtures are designed. Plumbing fixtures shall be maintained in a safe, sanitary and functional condition.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

All plumbing fixtures must operate adequately and perform their intended functions. Fixtures must drain quickly without permitting sewer gases to enter the structure. Fixtures are not to leak from either the water supply piping or the waste discharge piping.

Fixtures must not be worn or deteriorated so that they cannot be adequately cleaned. Kitchen sinks and lavatories that have defects that prevent them from being kept clean increase the likelihood that disease-causing organisms can be spread to food sources or from person to person. Fixtures with structural cracks can fail suddenly, possibly causing personal injury and further property damage.

ADDITIONAL CONSIDERATIONS

Cleanliness is key. Do not hesitate to fail an inspection for unsanitary conditions.



Plumbing Systems and Fixtures

FIXTURE CLEARANCES

Code Text

Plumbing fixtures shall have adequate clearances for usage and cleaning.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Inadequate clearance between fixtures and adjacent surfaces can create confined spaces that allow disease and odor-causing bacteria to multiply. For proper sanitation, the fixture must have sufficient clearances for proper use and cleaning.

Although the code does not specify exact clearances between fixtures and adjacent surfaces, the code official must use good judgment and must review the required clearances for compliance with the IPC.

ADDITIONAL CONSIDERATIONS

Cleanliness is key. Do not hesitate to fail an inspection for unsanitary conditions.



Plumbing Systems and Fixtures

PLUMBING SYSTEM HAZARDS

Code Text

Where it is found that a plumbing system in a structure constitutes a hazard to the occupants or the structure by reason of inadequate service, inadequate venting, cross connection, backsiphonage, improper installation, deterioration or damage or for similar reasons, the code official shall require the defects to be corrected to eliminate the hazard.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Any plumbing system having a deficiency or condition that is deemed by the code official as hazardous to the occupants or to the structure must be repaired or altered to eliminate the hazard. Hazards in a plumbing system include, but are not limited to, the following:

- Undersized piping
- Inadequate venting
- Cross connections
- Lack of backflow prevention means
- Lack of sufficient fixtures
- Improperly installed piping, fixtures or fittings
- Deteriorated, damaged, worn or otherwise defective piping, fixtures or fittings
- Inadequately supported fixtures or piping
- Inadequate water pressure or volume

One of the most commonly encountered hazards is a submerged outlet in older-style fixtures in water closets, bathtubs, lavatories, laundry tubs and water softeners. Cross connections and improperly protected outlets greatly increase the likelihood that contaminated water will be introduced into the potable water supply.



ADDITIONAL CONSIDERATIONS (ALLEGHENY COUNTY)

Refer property owners to the Allegheny County Health Department for permitting and inspection.



Water Systems

GENERAL

Code Text

Every sink, lavatory, bathtub or shower, drinking fountain, water closet or other plumbing fixture shall be properly connected to either a public water system or to an approved private water system. Kitchen sinks, lavatories, laundry facilities, bathtubs and showers shall be supplied with hot or tempered and cold running water in accordance with the International Plumbing Code.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

The water for all plumbing fixtures must be properly connected to either a public or an approved private water system. If there is any question about the quality of the private water source, the code official should require that the water be tested and approved by either a private testing service or a local health department. A plumbing system cannot be considered adequate if the water entering the system is contaminated or otherwise unfit for human consumption and use. The desired qualities for safe water are:

- Free of pathogenic organisms
- Free of toxic chemicals
- Free of odor, taste, color and turbidity
- Free of excessive minerals
- Relatively non corrosive
- Adequate in quantity and pressure

All sinks, lavatories, bathtubs and showers must be supplied with cold and hot or tempered running water as regulated by the IPC. Heated water is a basic necessity for all cleansing and bathing needs. It should be noted that the IPC only allows tempered water [water that is 85°F (29°C) to 110°F (43°C)] to be used for bathing and washing in nonresidential occupancies. The IPC requires tempered water to be supplied to hand-washing fixtures located in public toilet facilities.



Water Systems

CONTAMINATION

Code Text

The water supply shall be maintained free from contamination, and all water inlets for plumbing fixtures shall be located above the flood-level rim of the fixture. Shampoo basin faucets, janitor sink faucets and other hose bibs or faucets to which hoses are attached and left in place, shall be protected by an approved atmospheric-type vacuum breaker or an approved permanently attached hose connection vacuum breaker.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Cross connections and unprotected outlets are the most common sources of contamination in potable water systems. The IPC defines a cross connection as any physical connection or arrangement between two otherwise separate piping systems—one of which contains potable water and the other water of either unknown or questionable safety, steam, gas or chemical—whereby there exists the possibility for flow from one system to the other, with the direction of flow depending on the pressure differential between the two systems.

The code official might not always be able to discover all cross connections and unprotected outlets in a building, but should become familiar with the locations where such usually occur. Many older-style plumbing fixtures were designed or installed with built in submerged water supply outlets. A few of the more common fixtures and appliances that might have unprotected outlets include: water closets, bathtubs, lavatories, laundry tubs and hose bibbs (sill cocks). Water softener drains are often improperly connected to the drainage system, thereby creating cross connections [see Commentary Figure 505.2(1)].

There are two basic methods of preventing contamination of the potable water supply. The first is to provide an air gap between the water outlet and the flood level rim of the fixture. The second is to install backflow prevention devices in the water supply line.



An air gap is the ideal solution because it does not rely on the performance of mechanical devices to prevent backflow into the water supply. Typically, an air gap must be twice the diameter of the supply pipe to the fixture, but never less than 1 inch (25 mm) above the flood level rim. The requirements for air gap protection of fixtures are found in Table 608.15.1 of the IPC.

An example of an unprotected outlet is identified in Commentary Figure 505.2(2) when the following conditions exist:

- The third-floor water closet has the ball cock (fill valve) submerged in the water of the water closet tank.
- The water pressure within the building is low because of corrosion buildup in the water pipes or simultaneous usage of fixtures.
- The third-floor water closet is flushed, thereby opening the ball cock.
- Contaminated water can be drawn from the water closet tank into the supply pipes.

In such circumstances when the sink is filling, the pressure can be reduced to less than atmospheric at the water closet fill valve. This creates a siphon action in the water closet tank. A potentially hazardous event has occurred that could introduce contaminated water into the potable water supply. The solution to this problem is fairly simple. The water closet fill valve (ball cock) needs to be replaced with an anti-siphon fill valve that extends a minimum of 1 inch (25 mm) above the overflow tube in the water closet tank. Additionally, the water pressure throughout the building should be increased by replacing or upsizing the water supply piping.

Another common backflow hazard can result from hoses being attached to threaded outlets. Backflow can occur when the open end of the hose is submerged in any liquid. For example, the possibility of backflow exists when a homeowner uses a hose to spread chemical fertilizers, herbicides or insecticides. If negative pressure should occur in the water supply piping, the water and chemicals from the hose could be siphoned into the water supply.

The solution to this problem is to install a hose-connection- type vacuum breaker on the water supply outlet fitting. When a negative pressure occurs in the water supply, the vacuum breaker opens to the atmosphere allowing air to enter the piping system, thus “breaking” the vacuum.

A type of cross connection occurs when a water supply is connected directly to an appliance or a piece of equipment. Some examples are water supplies to hot water and steam boilers; lawn irrigation systems; fire suppression systems; carbonated beverage machines and equipment used for various industrial applications, such as manufacturing. These items are typically not able to function with an air gap between the supply pipe and the appliance or fixture. Consequently, some type of backflow preventer device must be installed in the water supply line to prevent the water flow from reversing



direction. Common types of protection are pressure-type vacuum breakers, barometric loops and reduced pressure principle backflow preventers.

Any time there is not an obvious air gap or visible backflow preventer device in a water supply line, the code official should attempt to determine if a hazard exists. Cross connections between a private water supply (typically a well system) and a potable public water supply are not permitted under any circumstance. If the groundwater becomes contaminated, a cross connection could affect the entire public water supply system.

The code official should work with local plumbing inspectors or water departments to identify and eliminate all cross connections and unprotected potable water outlets.

ADDITIONAL CONSIDERATIONS

The atmospheric-type vacuum breaker (AVB) functions as a backflow preventer to prevent contamination of the portable water supply. You cannot test an AVB, so it is difficult to tell if it still functions properly. The likelihood of contamination from siphoning back into the system is low.



Water Systems

SUPPLY

Code Text

The water supply system shall be installed and maintained to provide a supply of water to plumbing fixtures, devices and appurtenances in sufficient volume and at pressures adequate to enable the fixtures to function properly, safely, and free from defects and leaks.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Inadequate water pressure or insufficient volume can cause plumbing fixtures, washing machines, dishwashers and other appliances to operate improperly. Inadequate water pressure can restrict the flow of water into bathtubs, showers and sinks to the point that the fixtures are not usable. The code requires enough pressure and volume so that all fixtures and appliances are functional and free of undue hazards.

There are many causes of inadequate water pressure and lack of sufficient volume. A few of the common causes include the following:

- Private wells.
- Inadequate ground-water supply.
- Defective pump or a pump that has lost its prime.
- Storage tank that has lost its air cushion.
- Sand or silt plugging the well point.
- Municipal systems.
- Inadequate pressure in the public water main.
- Sudden loss of pressure in an area caused by the use of a nearby fire hydrant, a broken main water line, etc.

Quite frequently, an inadequate water supply is the result of problems within a building. A few examples include clogged or corroded pipes, undersized piping, crimped or bent pipes and a system that is



inadequately designed. A change in occupancy of a building might create demands that exceed the original water piping capacity.

ADDITIONAL CONSIDERATIONS

1. Check for leaks in the visible plumbing system in the basement. Require any leaks to be repaired.
2. Check for good water pressure in sinks, showers, laundry tubs, etc.



Water Systems

WATER HEATING FACILITIES

Code Text

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 minimum temperature of 110°F (43°C). A 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.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

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) (1034kPa).
- 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.
- Does the relief valve have a discharge pipe to divert heated water toward the floor and to a point where it will not cause damage to the structure? The discharge pipe must be rigid piping of the same diameter as the relief valve outlet. The lower end of the discharge pipe must not be closed or plugged and is not to have a threaded end that would invite closure. The relief valve discharge pipe must not be located where it would be subject to freezing, as this could result in a complete blockage of the pipe.

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 Commentary 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.

ADDITIONAL CONSIDERATIONS

The best way to test the heat from the hot water tank is to turn on the water in the bathroom on the highest floor. IPMC only requires that the hot water be a minimum of 110 degrees Fahrenheit. Place your hand under the water to test the heat and use your best judgement as to whether it meets the temperature requirements.

Drainage Requirements:

There are no specific requirements for existing structures. Many existing structures were built without floor drains or have been capped and filled in as many that were built did not have traps and the odor backed up into the structure.

Other considerations for Hot Water Tanks:

Overflow Pipe:

- Must be located parallel to the tank and should be 6" above the floor level
- Constructed of copper, PVC, or other rigid material
- Must be free of leaks
- Overflow pipe must be connected to a functioning temperature and pressure relief valve



Pressure Relief Valve:

- Does the pressure of the relief valve exceed the maximum pressure of the tank and is less than 150 psi?
- This valve must be within the top 6" of the tank or on top of the tank
- Is the pressure relief valve leaking?
- Is it corroded?
- Is it rated equal or greater than the BTU of the water heater?
- Are there any other leaks such as at the cold water supply, hot water discharge, or anywhere else on the tank?

Flue/Chimney

- Hot water tank flue must have positive updraft.
- Flue must be in good condition with no gaps other than at the draft hood at the top of the tank.
- Must be constructed of aluminum, galvanized steel or stainless steel.
- Joints to be fastened with sheet metal screws, rivets or other similar fasteners.
- Is the hot water tank flue free of combustible materials and located at least 1" from the flue?
- Is the flue deteriorated in any way, corroded or showing any signs of condensation?
- Is the flue properly supported and properly connected into the chimney?
- Does the chimney show any visible signs of deterioration? (In the basement and any other place where you can see the chimney)

Location

- Is there adequate combustion air around the hot water tank?
- If the hot water tank is in a closet or confined space, there should be louvers on the door to provide for adequate air and to prevent overheating of the tank

Fuel/Electric Supply

- Is the fuel piping adequate, damaged or constructed of the proper materials?
- Is there a shut off valve to stop the supply of fuel to the hot water tank?
- Is there a sediment trap in the fuel line?
- Is the thermostat operational and in good condition with no evidence of tempering?
- Is the electric service adequate to handle an electric hot water tank?
- Is the electric service line to the hot water tank adequately sized and properly installed to the hot water tank?



If the inspector has any concerns about the proper installation of the hot water tank, consult Figure 505.4 in the 2015 IPMC. If still unsure or concerned about the hot water tank, do not hesitate to require a plumbing inspection by a UCC Certified Plumbing Inspector. In Allegheny County, require that the hot water tank be inspected by the Allegheny County Health Department.



Sanitary Drainage System

GENERAL

Code Text

Plumbing fixtures shall be properly connected to either a public sewer system or to an approved private sewage disposal system.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Plumbing fixtures must be connected to an approved public or private sewer system. Private systems that should not be approved would include pit privies, cesspools or any system that discharges to storm drains, ponds, lakes, streams or rivers.

ADDITIONAL CONSIDERATIONS

Do your municipalities require dye tests, camera inspections, smoke tests, or other tests on the sanitary lateral and tap-in at the time of sale or prior to occupancy? If so, require a copy of the inspection report prior to issuing the occupancy permit.



Sanitary Drainage System

MAINTENANCE

Code Text

Every plumbing stack, vent, waste and sewer line shall function properly and be kept free from obstructions, leaks and defects.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

All waste, soil, sewer and vent piping must be installed and maintained so as to function properly. Obstructions or defects that present health hazards must be corrected. Leaking pipes or joints must be replaced or repaired. All repairs and new installations must be in accordance with the IPC.

A thorough and accurate inspection of the plumbing system requires knowledge of plumbing systems; however, with training and experience, the code official can identify typical problems and improper installations. In broad terms, he or she should inspect the following elements of a plumbing system: fixtures; sanitary drainage systems; vents and venting; traps; drainage cleanouts; and hangers and supports.

1. Sanitary drainage system: The system must be free of leaks. Leaking drain pipes can cause structural damage and spread illness from the pathogenic organisms in the waste water.

The code official should inspect all visible drain pipes for any improper connections or installations. A few frequently encountered problems include the following:

- a. Improperly installed materials: Materials not designed or approved for plumbing applications are often used for repairs and modifications in plumbing systems. The improper use of fittings, joining means and connectors is common in existing structures. Drainage piping with no slope or reverse slope can promote blockages.
- b. Joints and pipes that have been “patched” with tape, putty, caulking or tar thus indicating past or current leakage in the drainage system.



c. Unworkmanlike installation: This often indicates that an untrained handyman has made repairs. The code official should check the entire system for any indications of unvented fixtures, improper materials or other typical violations. Additionally, it should be determined whether permits were obtained to install the work.

2. Vents and venting: Plumbing systems are designed with an integral venting system to prevent loss of the water seals in fixture traps. Fixture vents must be provided and maintained where necessary to protect traps from pressure fluctuations and siphon action that cause loss of the water seal.

3. Traps: Each plumbing fixture must have a trap at the connection to the sanitary drainage system. A trap creates a water seal that prevents sewer gas from entering the structure. Sewer gases can be toxic and carry bacteria-laden aerosols. Some types of sewer gases are even explosive.

4. Hangers and supports: Improperly or inadequately supported waste and vent piping frequently indicates a nonprofessional installation. All piping is required to be adequately supported to maintain pitch and alignment and prevent strain on connections and joints.

In general, the code official should inspect the entire visible plumbing system for: leakage; the presence of fixture, standpipe and floor drain traps; approved materials (with approved connections) and an acceptable venting system.



Saintary Drainage System

GREASE INTERCEPTORS

Code Text

Grease interceptors and automatic grease removal devices shall be maintained in accordance with this code and the manufacturer's installation instructions. Grease interceptors and automatic grease removal devices shall be regularly serviced and cleaned to prevent the discharge of oil, grease, and other substances harmful or hazardous to the building drainage system, the public sewer, the private sewage disposal system or the sewage treatment plant or processes. Records of maintenance, cleaning and repairs shall be available for inspection by the code official.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

This section clarifies that grease interceptors and automatic grease removal devices require ongoing, routine maintenance in order to perform their intended functions. Any such maintenance should be in accordance with the manufacturer's maintenance criteria. The language is coordinated with the provisions of Section 1003.1 of the IPC, which establishes when these devices are required to be installed. Failure to maintain these devices results in public health risks via sanitary sewer overflows into buildings, roads and streams and premature deterioration and failure of public and private sewage systems.

ADDITIONAL CONSIDERATIONS

If the property owner cannot provide a recent cleaning or maintenance report, require the system to be cleaned and inspected prior to issuing Certificate of Occupancy.



Storm Drainage

GENERAL

Code Text

Drainage of roofs and paved areas, yards and courts, and other open areas on the premises shall not be discharged in a manner that creates a public nuisance.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Storm water must be discharged so that it does not pond in paved areas, yards, courts or open areas. Standing water can freeze in cold climates, thereby causing a slip hazard. In warm weather, standing water can create an insect breeding ground.

Roof gutters and downspouts are not required, provided that storm water is discharged in such a manner that it does not create a public nuisance.

The code official should also check local ordinances to determine if run-off storm drainage water and sump pumps can be allowed to enter the sanitary sewer system. Most communities are now requiring all storm drainage water to be separated from the sanitary sewer system. Disconnecting the storm water from the sanitary sewer system can reduce the costs of sewage treatment and eliminate an overload of the treatment facility.

The emphasis in storm drainage is to remove the water quickly without creating hazards to pedestrians or causing damage to any structures on the same or neighboring property.

ADDITIONAL CONSIDERATIONS

In this case, the definition of “public nuisance” is subjective. Consider whether storm water discharges directly to a neighbor's property, at the foundation of the owner's property, directly into the sidewalk or street, etc.



General

SCOPE

Code Text

The provisions of this chapter shall govern the minimum mechanical and electrical facilities and equipment to be provided.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Minimum performance guidelines for mechanical and electrical facilities and equipment are established in this chapter. Installations that do not conform to these minimum criteria are unacceptable.

ADDITIONAL CONSIDERATIONS

All repairs and additions to plumbing systems must be permitted and inspected by the Allegheny County Health Department. Require a copy of the County Inspection report prior to issuance of any Certificate of Occupancy. International Plumbing Code does not apply in Allegheny County. Applies to interior plumbing, sanitary sewer lateral and storm sewer lateral if it is connected into a storm collection system. Allegheny County Plumbing Code is 78 pages. Don't bother trying to learn it or interpret it as the County may have a different interpretation. Instruct property owner to contact ACHD Plumbing Division. Contact information is 412-578-8036. Website: www.achd.net/plumbing/



Responsibility

RESPONSIBILITY

Code Text

The owner of the structure shall provide and maintain mechanical and electrical facilities and equipment in compliance with these requirements. A person shall not occupy as owner-occupant or permit another person to occupy any premises that does not comply with the requirements of this chapter.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

It is the responsibility of the owner of the structure to provide and maintain the required electrical and mechanical facilities. An owner must not occupy or allow any other person to occupy a structure that is not in compliance with this chapter; thus, the requirements of this chapter are the minimum necessary to make a structure occupiable.



Heating Facilities

FACILITIES REQUIRED

Code Text

Heating facilities shall be provided in structures as required by this section.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

This section establishes the scope of requirements in Section 602 [see the International Mechanical Code® (IMC®) for space-heating requirements for new structures].



Heating Facilities

RESIDENTIAL OCCUPANCIES

Code Text

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, nor shall portable unvented fuel-burning space heaters be used, as a means to provide required heating.

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.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

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. This 68°F (20°C) standard 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 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 on 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 ($21/2\%$ of 2,160 = 2,160 hours $0.025 = 54$).

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 cooktop 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.

This section also prohibits the use of fuel-burning, unvented space heaters as a means to provide any portion of the heating that is required for residential occupancies. Similar to cooking appliances, fuel-burning, portable unvented space heaters can be dangerous, especially when used as one of the essential means of providing the required heat. Occupants are likely to locate portable space heaters in rooms where they should not be and also locate such heaters too close to combustible materials and furnishings.

The exception recognizes that in warmer portions of the country, where 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.

ADDITIONAL CONSIDERATIONS

Assure that there are furnace vents in each room including the bathrooms and powder rooms. Turn the furnace on to assure it works properly. If there are combustion heaters present at the time of inspection, the inspection must be failed until the combustion heater(s) is removed from the premises. Electric space heaters are permissible but must be used so that they are not near any combustible materials. Fail any inspection where the space heater is too close to combustible materials.



Heating Facilities

HEAT SUPPLY

Code Text

Every owner and operator of any building who rents, leases or lets one or more dwelling units or sleeping units on terms, either expressed or implied, to furnish heat to the occupants thereof shall supply heat during the period from [DATE] to [DATE] to maintain a minimum temperature of 68°F (20°C) in all habitable rooms, bathrooms and toilet rooms.

Exceptions:

1. When the outdoor temperature is below the winter outdoor design temperature for the locality, maintenance of the minimum room temperature shall not be required provided that the heating system is operating at its full design capacity. The winter outdoor design temperature for the locality shall be as indicated in Appendix D of the International Plumbing Code.
2. In areas where the average monthly temperature is above 30°F (-1°C), a minimum temperature of 65°F (18°C) shall be maintained.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

The owner or operator of a rental residential property who agrees to provide heat by express agreement or implication must provide it to all habitable rooms, bathrooms and toilet rooms. The heat supply must be capable of maintaining a temperature of at least 68°F (20°C), 24 hours per day. The occupants could set the temperature in the space under their control at a lower temperature if desired, but 68°F (20°C) must be attainable. Based on local climatic conditions, each community needs to establish the period of the year during which heating equipment must be in operation in order to maintain the required temperatures. The intent of this section is to protect tenants from being subjected to uncomfortable and unhealthy conditions created by undersized, malfunctioning, defective or otherwise inadequate space-heating systems. Having adequate space heating also helps eliminate the need for auxiliary room/space heaters, as well as the unsafe use of cooking appliances for space heating (see Section 602.2). When tenants are forced to use room/space heaters, the risk of fire and asphyxiation increases because of



improper use, contact with or close proximity to combustible materials; overloaded wiring and extension cords; lack of ventilation and the user's typical lack of understanding of the potential hazards.

Exception 1 recognizes the limitations of all heating systems that operate when the outdoor temperature is below the design temperature. This exception states that the minimum indoor temperature requirement of 68°F (20°C) does not apply when the outdoor temperature is below the design temperature for the heating system. The exception addresses only the circumstance where the heating system cannot keep up because the outdoor conditions exceed that for which it was designed (see Section 602.2). The exception applies only to heating systems that are operating at their full design capacity (heat output). It does not apply to improperly designed systems, undersized systems or any system operating at less than its full output for whatever reason. On those rare days when the outdoor temperature is lower than what the heating system was designed to handle, it is anticipated that the indoor temperature might not be attainable. Heating systems that were sized based on outdoor temperatures above the actual outdoor design temperature for the locality in which they are installed are improperly designed, and as such, do not comply with the intent of the exception (see commentary, Section 602.2).

Exception 2 is the same as the exception to Section 602.2.

ADDITIONAL CONSIDERATIONS

Although the adoption ordinances in each municipality probably don't specify the date ranges for supplying heat, you could not pass the structure without testing the system. Therefore, you must assure that the heating system is functioning at the time of your inspection regardless of the date of the inspection since you probably will not return to the structure prior to heating season.



Heating Facilities

OCCUPIABLE WORKSPACES

Code Text

Indoor occupiable work spaces shall be supplied with heat during the period from [DATE] to [DATE] to maintain a minimum temperature of 65°F (18°C) during the period the spaces are occupied.

Exceptions:

1. Processing, storage and operation areas that require cooling or special temperature conditions.
2. Areas in which persons are primarily engaged in vigorous physical activities.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Mercantile, business, factory and similar occupancies in which people are employed must be kept at a temperature of at least 65°F (18°C) during the hours that employees are working. People cannot be expected to work productively and remain in good health if their workplace is uncomfortable. The 65°F (18°C) minimum is lower than required for residential occupancies and is intended to apply to the typical workplace having sedentary employee activities.

Exception 1 recognizes that some occupancies have operations and processes that require temperatures lower than 65°F (18°C), including meat-packing plants, canneries and manufacturing facilities.

Exception 2 recognizes that a minimum temperature of 65°F (18°C) is not necessary where employees are engaged in physical activities such as construction, fabrication and loading in factories.

The period of the year during which structures must comply with this section is to be established by each locality based on local climatic conditions.



ADDITIONAL CONSIDERATIONS

Just as the previous section notes, these systems must be present and operable at the time of inspection.



Heating Facilities

ROOM TEMPERATURE MEASUREMENT

Code Text

The required room temperatures shall be measured 3 feet above the floor near the center of the room and 2 feet inward from the center of each exterior wall.

Exceptions:

1. Processing, storage and operation areas that require cooling or special temperature conditions.
2. Areas in which persons are primarily engaged in vigorous physical activities.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

To determine compliance with Section 602, temperature measurements are required to be taken at multiple locations. For example, in a room with two exterior walls, a total of three measurements is required. The room temperature requirements of Section 602 must be met in all of the measurement locations. The intent is to make sure that the required temperature will be uniformly reached throughout the occupiable portions of the room or space. The coldest part of a room during the heating season will typically be at the floor level by an outside wall. The measurements are taken at points that are expected to be occupied and that do not reflect the potential temperature extremes in a space (see Commentary Figure 602.5).

Any space that cannot maintain the minimum indoor temperatures as established in Section 602 when the outdoor temperature is at or above the design temperature for the locality should be posted as unfit for human occupancy until enough heat can be supplied.

ADDITIONAL CONSIDERATIONS

Don't spend a lot of time trying to get accurate measurements. Set the thermostat to 68 degrees at the beginning of your inspection and check to see if it can attain that.



Mechanical Equipment

MECHANICAL APPLIANCES

Code Text

Mechanical appliances, fireplaces, solid fuel-burning appliances, cooking appliances and water-heating appliances shall be properly installed and maintained in a safe working condition, and shall be capable of performing the intended function.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Because appliances, mechanical equipment and fireplaces are subject to aging, wear and deterioration, periodic inspection and servicing is required to maintain performance and to verify continued safe operation. Fireplaces and solid fuel-burning appliances must be properly installed, inspected and maintained. They require frequent inspection and maintenance because of the extreme temperatures and corrosive flue gases to which they are subjected. Routine cleaning is required to remove the highly flammable creosote deposits found in chimneys and connectors. Inspections should include such related items as chimney flues, chimney caps, dampers, doors, screens, connectors, hearth extensions and clearances to combustibles.

Appliances located in buildings that are not owner occupied are less likely to receive attention or be observed and are therefore more likely to be neglected. Appliances of concern include water heaters, furnaces, boilers, room heaters, clothes dryers and cooking appliances.

Fireplaces and solid fuel-burning appliances must be installed and maintained in accordance with the IMC.

The appliance manufacturer's installation instructions and the IMC, International Fuel Gas Code® (IFGC®) and IPC should be consulted in determining if an appliance or mechanical equipment is installed properly.



ADDITIONAL CONSIDERATIONS

This includes furnaces, water heaters, boilers, room heaters, clothes dryers, and all cooking appliances. Also includes fireplaces, wood burners, pellet stoves and other solid fuel burning appliances.



Mechanical Equipment

REMOVAL OF COMBUSTION PRODUCTS

Code Text

Fuel-burning equipment and appliances shall be connected to an approved chimney or vent.

Exception:

Fuel-burning equipment and appliances that are labeled for unvented operation.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

All fuel-burning appliances are required to discharge the products of combustion (flue gases) to an approved chimney or vent (see exception). Chimneys and vents must be capable of creating sufficient draft to properly vent the appliances served. Appliances that are listed and labeled for unvented operation such as domestic cooking appliances, room heaters and gas-fired refrigerators are exempt from this requirement.

Some components of the combustion products produced by fuel-burning appliances are toxic to humans and animals and can cause illness and death. The most harmful component of combustion products is carbon monoxide (CO). Typical symptoms of CO poisoning are nausea, headache, dizziness, disorientation, confusion, rapid breathing, fatigue, flu-like symptoms and loss of consciousness. Exposure to CO is detrimental to health in all cases and can be lethal depending upon its concentration, the duration of exposure and the condition of the occupants. Combustion products must not be allowed to enter or leak into any occupiable or habitable space.

Chimneys and vents should be periodically inspected for deterioration or blockage that could impair their operation or allow combustion products to leak into the building. The appliance and equipment connections to a chimney or vent should also be inspected for deterioration, blockage or separation of connections.

Evidence of chimney or vent connector decay or rusting generally indicates improper draft. A venting system that creates insufficient draft or that is subject to backdraft (reverse flow) will experience



accelerated deterioration because of the corrosive effect of the combustion products (flue gases). “Draft” is the pressure differential necessary to cause the flow of flue gases from the appliance or equipment to the chimney or vent and up to the outdoor atmosphere. Proper draft should be verified by a trained heating technician and should be checked each time the appliance or equipment is serviced.

The exception recognizes that a chimney or vent is not required for fuel-burning appliances listed and labeled for unvented operation. It is imperative that unvented appliances be operated and maintained in strict accordance with the manufacturer’s instructions (see the IFGC for additional requirements for unvented room heaters).

ADDITIONAL CONSIDERATIONS

Check all flues leaving the appliance for deterioration including rust, holes and other damage. Separated joints must be repaired. All joints must be screwed or riveted together. Check for deterioration where the flue enters the chimney. Rusting generally indicates an improper draft which must be repaired. Check for proper up-draft.



Mechanical Equipment

CLEARANCES

Code Text

Required clearances to combustible materials shall be maintained.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Proper clearances must be maintained between combustible materials and all heat-producing appliances and equipment. Adequate clearances are necessary to prevent the possible ignition of combustibles. The required clearances for the labeled appliances and equipment must be maintained in accordance with the manufacturer's requirements. Clearances for chimneys, vents and their connectors are also specified in the IMC and IFGC.

Frequently, an inspector will encounter combustible materials that have been placed too close to heat-producing appliances and equipment after the initial installation. Combustible storage, furnishings and remodeling are typical examples of such encounters. Most occupants are unaware of the hazard created when they store combustibles near or in contact with heat-producing appliances.

It is imperative that adequate clearances be maintained to avoid a potential fire hazard.

ADDITIONAL CONSIDERATIONS

Make sure that any permanent combustible materials attached to the wall are a minimum of 1" from any visible portion of the flue. Check the tags or water heaters, furnaces and other heat-producing appliances for proper clearance between combustible materials. Make sure that there are no combustible materials such as boxes, papers, etc. in or around any heat producing area.



Mechanical Equipment

SAFETY CONTROLS

Code Text

Safety controls for fuel-burning equipment shall be maintained in effective operation.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

All appliances and heating equipment are equipped with safety controls and devices intended to prevent fire or explosion in the event of equipment malfunction or abnormal operation. Typical controls and devices are as follows: temperature limit switches; pressure limit switches; pressure relief valves; low-water cutoffs; stack controls; pilot safety controls; draft monitoring controls and flame supervision controls. These controls are designed to prevent such conditions as overheating, excessive pressures, loss of heat transfer medium, loss of ignition source, loss of venting means and loss of main flame, among others.

All such safety controls must be periodically tested and inspected to verify their proper functioning and assess their reliability. Such testing and inspection should be performed by trained technicians when the appliances are serviced and cleaned.

An inoperative or otherwise malfunctioning safety control or device could create an extreme life safety hazard

ADDITIONAL CONSIDERATIONS

Devices and controls typical in these appliances are temperature limit switches, pressure limit switches, pressure relief valves, low water cut-offs, stack controls, pilot safety controls, draft monitoring controls and flame supervision controls. Not all appliances have all of these controls and when they are present, they are difficult to inspect if you are not a qualified inspector of fuel-burning equipment. If the appliance seems to be working properly and there is no visible damage, assume that they are working properly. If



you are concerned about their functionality, you can require an inspection by a trained inspector or technician.



Mechanical Equipment

COMBUSTION AIR

Code Text

A supply of air for complete combustion of the fuel and for ventilation of the space containing the fuel-burning equipment shall be provided for the fuel-burning equipment.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Combustion air includes the air necessary for complete combustion of the fuel, the air required for draft hood dilution and the air necessary for ventilation of the enclosure in which the appliance is located. A lack of combustion air will result in the incomplete combustion of fuel that, in turn, causes soot production, increased CO production, serious appliance malfunction and the risk of fire or explosion. The lack of draft hood dilution air will result in improper draft and appliance venting. The incomplete combustion of fuel and improper draft and venting compound each other and greatly increase the risk of CO poisoning. The lack of ventilation air can result in excessive temperatures in the appliance enclosure, thereby introducing the risk of overheating the appliance and the risk of fire.

In existing structures, adequate combustion air provisions are often lacking or have been blocked, covered or otherwise defeated. Looking for proper combustion air supply is an important part of any inspection.

Fuel-burning equipment must be provided with combustion air in accordance with the IMC and IFGC.



Mechanical Equipment

ENERGY CONSERVATION DEVICES

Code Text

Devices intended to reduce fuel consumption by attachment to a fuel-burning appliance, to the fuel supply line thereto, or to the vent outlet or vent piping therefrom, shall not be installed unless labeled for such purpose and the installation is specifically approved.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Energy-saving devices are required to bear the label of an approved testing agency, must be installed in accordance with the manufacturer's installation instructions and must be installed with the specific approval of the code official.

Improperly installed or applied energy-saving devices can adversely affect the operation of an appliance and cause it to become unsafe. A common example would be the improper installation of a flue damper or restrictor device in the chimney or vent connector of a fuel-burning appliance. The resultant installation could cause vent failure and subject the occupants to CO poisoning. The installation of such devices would require a permit under the IFGC or IMC.



Electrical Facilities

FACILITIES REQUIRED

Code Text

Every occupied building shall be provided with an electrical system in compliance with the requirements of this section and Section 605.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

This section prescribes the minimum electrical facilities that must be installed and maintained in all buildings used for human occupancy.



Electrical Facilities

SERVICE

Code Text

The size and usage of appliances and equipment shall serve as a basis for determining the need for additional facilities in accordance with NFPA 70. Dwelling units shall be served by a three-wire, 120/240 volt, single-phase electrical service having a minimum rating of 60 amperes.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

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 NFPA 70. For dwelling units, the IRC also provides load calculation methods.

If the actual load exceeds the capacity of the service, this section is intended to prompt added capacity. 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 non-simultaneous 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 should be enlarged as necessary.

ADDITIONAL CONSIDERATIONS

- Must be a three-wire system.
- Check for proper grounding.
- Fuses are acceptable as long as the system is in acceptable condition.
- Proper fusing.
- Knob and tube is not acceptable.
- Check the fuse size. Typical 60-amp fuse box has four fuses. Cannot be more than 15 amps each.
- Check breaker size and wiring entering electric box. 14 gauge (white) – 15 amps, 12 gauge (yellow) – 20 amps.
- Check breakers that are tripped or turned off.



Electrical Facilities

ELECTRICAL SYSTEM HAZARDS

Code Text

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.

604.3.1 Abatement of electrical hazards associated with water exposure

The provisions of this section shall govern the repair and replacement of electrical systems and equipment that have been exposed to water.

604.3.1.1 Electrical equipment

Electrical distribution equipment, motor circuits, power equipment, transformers, wire, cable, flexible cords, wiring devices, ground fault circuit interrupters, surge protectors, molded case circuit breakers, low-voltage fuses, luminaires, ballasts, motors and electronic control, signaling and communication equipment that have been exposed to water shall be replaced in accordance with the provisions of the International Building Code.

Exception:

The following equipment shall be allowed to be repaired where an inspection report from the equipment manufacturer or approved manufacturer's representative indicates that the equipment has not sustained damage that requires replacement:

- Enclosed switches, rated a maximum of 600 volts or less
- Busway, rated a maximum of 600 volts
- Panelboards, rated a maximum of 600 volts
- Switchboards, rated a maximum of 600 volts
- Fire pump controllers, rated a maximum of 600 volts
- Manual and magnetic motor controllers



- Motor control centers
- Alternating current high-voltage circuit breakers
- Low-voltage power circuit breakers
- Protective relays, meters and current transformers
- Low and medium-voltage switchgear
- Liquid-filled transformers
- Cast-resin transformers
- Wire or cable that is suitable for wet locations and whose ends have not been exposed to water
- Wire or cable, not containing fillers, that is suitable for wet locations and whose ends have not been exposed to water
- Luminaires that are listed as submersible
- Motors
- Electronic control, signaling and communication equipment

604.3.2 Abatement of electrical hazards associated with fire exposure

The provisions of this section shall govern the repair and replacement of electrical systems and equipment that have been exposed to fire.

604.3.2.1 Electrical equipment.

Electrical switches, receptacles and fixtures, including furnace, water heating, security system and power distribution circuits, that have been exposed to fire, shall be replaced in accordance with the provisions of the International Building Code.

Exception:

Electrical switches, receptacles and fixtures that shall be allowed to be repaired where an inspection report from the equipment manufacturer or approved manufacturer's representative indicates that the equipment has not sustained damage that requires replacement.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

604.3

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.
- Lack of ground fault circuit interrupter (GFCI) protection.

The most common 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 conductors it is intended to protect, the device will permit the conductors to carry currents in excess of the conductors' capacity. The resultant overload will cause conductor heating, insulation deterioration and, possibly, a fire. The typical scenario involves an occupant who thinks he or she has "cured" a fuse-blowing problem by substituting fuses that are larger in size. In actuality, an extreme fire hazard has been created by eliminating the circuit conductor overcurrent protection. Type S tamper-proof fuses and adapters can be installed to prevent the occupants from installing the wrong size fuses.

604.3.1

The purpose of this section is to provide enforceable provisions to the code official that address hazards in electrical equipment that has been exposed to water. These provisions are derived from "Guidelines for Handling Water-damaged Electrical Equipment," published by the National Electrical Manufacturers Association (NEMA).

Section 604.3.1 defines the scope of the section as pertaining to electrical equipment and systems that have been exposed to water.

604.3.1.1

Listed in this section are certain types of electrical equipment that, if exposed to conditions such as



submersion in floodwater or inundation by fire sprinkler discharge, must be replaced. Protective components, such as circuit breakers, overload relays, low-voltage or medium-voltage protective devices within a switchgear assembly, and fuses are necessary for the safe operation of the distribution circuits and should be replaced when exposed to water. The ability of a transformer to operate as intended can be impaired by corrosion to the transformer core, flood debris deposited inside the transformer, or contamination of the transformer fluid. The exception to this section allows for repair of certain components of an electrical distribution system and certain electrical equipment provided that an inspection report from the equipment manufacturer or approved manufacturer's representative is submitted to the code official indicating that the level of damage to the equipment does not warrant replacement. Note that panelboards and switchboards listed in the exception refer to the boards, busses and related hardware, not the circuit breakers that they hold.

604.3.2

This section defines the scope of the section as pertaining to electrical equipment and systems that have been exposed to fire.

604.3.2.1

This section lists the type of electrical components and equipment that must be replaced, where they have been exposed to fire. Note that the code does not elaborate on what is meant by "exposed to fire," but the assumption is that the equipment and components have been subjected to heat, smoke and/or direct flame impingement. The ability of electrical switches, receptacles and fixtures—including furnace, water heating, security system and power distribution circuits—to operate as intended can be impaired by exposure to fire. The exception to this section allows for repair of these components provided that an inspection report from the equipment manufacturer or approved manufacturer's representative is submitted to the code official indicating that the level of damage to the equipment does not warrant replacement.

ADDITIONAL CONSIDERATIONS

In addition to above mentioned items, check for the following:

- Undersized service
- Insufficient receptacle distribution
- Lack of sufficient lighting fixtures
- Deteriorated, damaged or otherwise defective wiring, equipment and appliances
- Improperly installed wiring methods
- Lack of proper service or equipment grounding



- Open splices in wiring
- Inadequately supported devices, wiring or equipment
- Exposed conductors or components constituting a shock hazard
- Missing or damaged device cover plates
- Excessive use of extension cords
- Overloaded receptacles or circuitry
- Lack of GFCI Protection

604.3.1

When you encounter a situation where any of the components of the electrical system have been exposed to water, require an electrical inspection by a UCC Certified Electrical Inspector; copies of the inspection reports, including follow-up reports (to be submitted to you); and a UCC Permit for any repairs.



Electrical Equipment

INSTALLATION

Code Text

Electrical equipment, wiring and appliances shall be properly installed and maintained in a safe and approved manner.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

This section provides necessary safety requirements for electrical equipment, wiring and appliances.

All electrical equipment, wiring and appliances must be properly installed and maintained in accordance with this code and NFPA 70 or the International Residential Code® (IRC®). It is the responsibility of the building owner or operator to provide and safely maintain the electrical facilities required herein.



Electrical Equipment

RECEPTACLES

Code Text

Every habitable space in a dwelling shall contain not less than two separate and remote receptacle outlets. Every laundry area shall contain not less than one grounding-type receptacle or a receptacle with a ground fault circuit interrupter. Every bathroom shall contain not less than one receptacle. Any new bathroom receptacle outlet shall have ground fault circuit interrupter protection. All receptacle outlets shall have the appropriate faceplate cover for the location.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Every room or space in a dwelling unit that is used for living, sleeping, eating or cooking must be provided with at least two separate receptacle outlets. Such outlets must be as remote from each other as practicable. The quantity of receptacles required by this section is far less than that required by NFPA 70 and the IRC for new construction, but is considered to be a reasonable compromise for existing structures.

This provision is intended to minimize or eliminate the use of extension cords. The amount of electrical current that any extension cord can safely conduct is limited by the size of its conductors. This principle is not understood by much of the general population. As a result, extension cords are commonly overloaded by the connection of either too many appliances or any loads in excess of the cord's capacity. Overloading extension cords causes an increase in the conductor's temperature. This increase can exceed the temperature rating of the conductor's insulation, causing it to melt, decompose or burn. The burning insulation can easily start a fire, and the resultant loss of conductor insulation can cause a short circuit or ground fault that can also act as a source of ignition. The buildup of heat in an extension cord is often made worse by excessive cord length and by the insulating effect of rugs that often cover these cords. Extension cords are much more susceptible to physical damage than permanent wiring methods. Damage to cords increases the likelihood of shorts, ground faults and poor connections, all of which can cause a fire. In addition to the fire hazard, extension cords pose a tripping hazard to the occupants and, when damaged, pose an electric shock hazard.



Every laundry room is required to have at least one grounded-type receptacle outlet. Appliances typically used in a laundry room require a grounding conductor for safe operation. Grounding appliances reduces the risk of electrical shock, which can occur when an occupant comes in contact with a defective appliance. This section appears to allow a GFCI-protected receptacle outlet in lieu of a grounded-type receptacle; however, this is only allowed for very limited circumstances by NFPA 70. As a general rule, GFCI protection is not a substitute for grounding-type receptacles. Where grounding-type receptacles cannot be installed, a GFCI receptacle offers a measure of protection from electrical shock. Adding GFCI protection to existing receptacle outlets is generally simple and inexpensive. Where existing boxes are small or crowded, surface extension boxes can be added to make room or GFCI circuit breakers can be used for the branch circuit.

Every bathroom must have at least one receptacle outlet to accommodate the many grooming and personal hygiene appliances that are commonly used in bathrooms. This requirement also applies to toilet rooms with lavatories that do not contain bathing fixtures, as they could also be used for grooming and personal hygiene purposes. If a bathroom receptacle outlet has to be installed in order to achieve compliance with this section, this code, NFPA 70 and the IRC, all would require GFCI protection for such outlet.

To protect occupants from accidental contact with electrical wiring or components, appropriate faceplates are required for all receptacles.

The installation of a receptacle where one previously did not exist is considered new work and must comply with the provisions of NFPA 70 or the IRC.

ADDITIONAL CONSIDERATIONS

Although the IPMC does not specify how many outlets are required in non-habitable spaces, it is a good practice to require at least one in every room to reduce the need for extension cords. NFPA, IRC and NEC require more outlets for new construction but IPMC is specific as to the minimum which is much less than for new construction. Powder rooms also require an outlet even though they do not fall under the strict definition of a bathroom.



Electrical Equipment

LUMINAIRES

Code Text

Every public hall, interior stairway, toilet room, kitchen, bathroom, laundry room, boiler room and furnace room shall contain not less than one electric luminaire. Pool and spa luminaires over 15 V shall have ground fault circuit interrupter protection.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Permanent lighting outlets must be provided to illuminate hallways, stairways, kitchens, bathrooms and laundry, toilet, 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 inspection and 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.

Lighting related to pools and spas is required to be protected with GFCIs when it is over 15 volts. Providing this protection in these wet locations results in safer conditions for the users.



Electrical Equipment

WIRING

Code Text

Flexible cords shall not be used for permanent wiring, or for running through doors, windows, or cabinets, or concealed within walls, floors, or ceilings.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

The use of flexible cords in place of permanent fixed wiring is typically an indication of inadequate electrical wiring capacity or incompatible demands. Physical damage to flexible cords caused by concealment or improper or inadequate maintenance could result in localized resistance heating, shorts and ground faults.

The amount of electrical current that any flexible cord can safely conduct is limited by the size of its conductor, its insulation type and its environment. This principle is often not understood by the general public. As a result, extension cords are commonly overloaded by connecting appliances and other loads in excess of the cord's capacity.

Overloading of flexible cords causes an increase in the conductor's temperature. This increase in temperature can exceed the temperature rating of the conductor insulation, causing it to melt, decompose or burn. The burning insulation can ignite other combustible materials. The resulting loss of conductor insulation can also cause a short circuit or ground fault that can act as a source of ignition. The buildup of heat in an extension cord is often made worse by excessive cord length and by the insulating effect of rugs that often cover extension cords. Flexible cords are much more susceptible to physical damage than permanent wiring. Damage to flexible cords increases the likelihood of shorts and poor connections, both of which can cause a fire.

In addition to the fire hazard, extension cords pose a tripping hazard to the occupants and, when damaged, can pose an electrical shock hazard. Securing flexible cords to a wall baseboard, door jambs, etc., with nails, staples or other fasteners to eliminate tripping hazards can create another



dangerous condition by pinching or piercing the cord and causing shorts or faults that could lead to ignition.

The code officer should look for an electrical inspection sticker on the first panel after the meter.



Elevators, Escalators, and Dumbwaiters

GENERAL

Code Text

Elevators, dumbwaiters and escalators shall be maintained in compliance with ASME A17.1. The most current certificate of inspection shall be on display at all times within the elevator or attached to the escalator or dumbwaiter, be available for public inspection in the office of the building operator or be posted in a publicly conspicuous location approved by the code official. The inspection and tests shall be performed at not less than the periodic intervals listed in ASME A17.1, Appendix N, except where otherwise specified by the authority having jurisdiction.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Elevators, escalators and dumbwaiters must be maintained in compliance with ASME A17.1, Safety Code for Elevators and Escalators. ASME A17.1 contains requirements for periodic inspection and testing that are necessary to detect any possible defects. The safety of the occupants is dependent upon routine safety checks performed by competent elevator service technicians.

Displaying the certificate of inspection is an aid to building inspectors and provides the users of the machinery with some confidence in its safety. This requirement will also encourage the owner to obtain the required inspections. Additionally, the option to post the certificate in a publicly conspicuous location approved by the code official allows a building operator to request that the certificate be placed in a location other than in the elevator or on the escalator or dumbwaiter, provided that location is publicly conspicuous and approved by the code official.



ADDITIONAL CONSIDERATIONS

PA Department of Labor and Industry is responsible for all elevators, escalators and dumbwaiters. Make sure there is a current and valid Certificate of Operation on site. Inspection should have occurred in the past 6 months and should be noted in the upper left corner of the certificate. If not, require an inspection prior to the issuance of occupancy.



Elevators, Escalators, and Dumbwaiters

ELEVATORS

Code Text

In buildings equipped with passenger elevators, not less than one elevator shall be maintained in operation at all times when the building is occupied.

Exception:

Buildings equipped with only one elevator shall be permitted to have the elevator temporarily out of service for testing or servicing.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

If a building has more than one passenger elevator, at least one such elevator must be kept operational during all periods of building occupancy. As indicated in the exception, a building with only one elevator is allowed to have its elevator temporarily out of service only for the purpose of maintenance, repair or testing.



Duct Systems

GENERAL

Code Text

Duct systems shall be maintained free of obstructions and shall be capable of performing the required function.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Exhaust ducts for toilet rooms, bathrooms, kitchens and clothes dryers require maintenance to prevent blockages and obstructions that can cause appliance/equipment malfunction, poor performance and potential fire hazards. Heating, cooling and ventilation ducts also need to be maintained to allow proper airflow, to maintain proper HVAC equipment operation and to help eliminate airborne contaminants that could cause health hazards. Ducts can collect hazardous quantities of grease, lint, dust and debris that could be potential fire hazards. Duct systems of all types are typically ignored by building owners and occupants and thus receive little or no maintenance.

ADDITIONAL CONSIDERATIONS

Check all exhaust locations for these installations to make sure that they are not blocked and that the exhaust is escaping to the outside of the building.



General

SCOPE

Code Text

The provisions of this chapter shall govern the minimum conditions and standards for fire safety relating to structures and exterior premises, including fire safety facilities and equipment to be provided.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

In the International Codes® (I-Codes®), the foremost code to address fire safety in existing buildings is the International Fire Code® (IFC®). Fire safety is also within the scope of the code; however, for correlation with the IFC most of the requirements of Chapter 7 either parallel or directly reference that code. As stated in the preface to this commentary, sections of this chapter with the [F] designation in front of the section number are controlled initially by the International Fire Code Development Committee during the annual code change process of the International Code Council® (ICC®), thereby preventing conflicts between the code and the IFC.

Fire safety requirements having to do with means of egress, fire-resistance rating of building elements and fire protection systems, such as sprinklers and smoke detectors, are addressed in this chapter. Fire safety topics such as storage of combustibles, use or storage of hazardous materials and the regulation of certain activities or operations within buildings that contribute to the fire hazard are covered exclusively in the IFC.



General

RESPONSIBILITY

Code Text

The owner of the premises shall provide and maintain such fire safety facilities and equipment in compliance with these requirements. A person shall not occupy as owner-occupant or permit another person to occupy any premises that do not comply with the requirements of this chapter.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

The owner of the premises should provide and maintain such fire safety facilities and equipment in compliance with these requirements. A person should not occupy as owner-occupant or allow another person to occupy any premises that does not comply with the requirements of this chapter.

This section clearly establishes that the owner of the premises is responsible for compliance with these requirements. Whereas occupants who are not owners have some responsibility in regard to clean and safe conditions within individual dwelling units (see Section 301.2), the requirements of this chapter pertain to building systems and components that are not typically under the control of the occupants.



Mean of Egress

GENERAL

Code Text

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.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

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.

ADDITIONAL CONSIDERATIONS

Please keep in mind, that 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 code.



Mean of Egress

AISLES

Code Text

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

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

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 aisles to be unobstructed so that they will serve their intended (and required) function.



Mean of Egress

LOCKED DOORS

Code Text

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.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

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 that 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 door knobs or lever mechanisms, are the preferred alternative if security is needed.

ADDITIONAL CONSIDERATIONS

When dealing with a single-family dwelling or an apartment, no door to the outside or to a common area in an apartment building shall utilize a key to unlock the door from the inside. Doors to the outside from a common area on an apartment building or commercial building shall have panic hardware that can easily be pushed to open and unlock the door.

Although the code section says "Means of Egress Doors" shall be readily openable from the side which egress is to be made without the need for keys, special knowledge or effort, you should consider all



doors in the structure a Means of Egress Door even if the applicable code does not, since you do not know where an individual would have to flee from in the event of a fire.



Mean of Egress

EMERGENCY ESCAPE OPENINGS

Code Text

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.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

This section 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 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 movable 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.



Fire-Resistant Ratings

FIRE-RESISTANCE-RELATED ASSEMBLIES

Code Text

The required fire-resistance rating of fire-resistance-rated walls, fire stops, shaft enclosures, partitions and floors shall be maintained.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

The “required fire-resistance rating” means the required rating of walls or floors at the time of construction. These required rated assemblies cannot be compromised in terms of construction or they will not perform as intended in a fire emergency. For instance, holes for running pipe or cable cannot be created in rated corridor walls where they extend above the ceiling line if the rated walls were required at the time of construction to extend to the floor deck above. Penetrations of this type would be prohibited unless protected as set forth in the IBC for new construction. Similarly, wall sheathing on rated walls cannot be removed and replaced unless the new material conforms to the listing for the rated wall.



Fire-Resistant Ratings

OPENING PROTECTIVES

Code Text

Required opening protectives shall be maintained in an operative condition. Fire and smoke stop doors shall be maintained in operable condition. Fire doors and smoke barrier doors shall not be blocked or obstructed or otherwise made inoperable.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

Opening protectives are window and door assemblies that have been tested in accordance with the applicable standard and have a fire protection rating. For example, corridor walls that are required to be rated are also required to have rated door assemblies (typically 20 minutes) protecting the door openings. These doors are required to be self-closing or automatic closing so that they can serve their intended function and limit the spread of smoke and fire in a fire emergency. If a closer is removed or the door is propped open by a doorstop, the door has been made inoperable and would allow the free passage of flame and smoke as if the opening were not protected. Similarly, if a fire shutter protecting a window opening is removed or propped open such that it will not operate upon detection of heat, it has been made inoperable and violates this section of the code.



Fire Protection Systems

GENERAL

Code Text

Systems, devices and equipment to detect a fire, actuate an alarm, or suppress or control a fire or any combination thereof shall be maintained in an operable condition at all times in accordance with the International Fire Code.

[F] 704.1.1

Automatic sprinkler systems. Inspection, testing and maintenance of automatic sprinkler systems shall be in accordance with NFPA 25. [F]

704.1.2

Where the fire department connection is not visible to approaching fire apparatus, the fire department connection shall be indicated by an approved sign mounted on the street front or on the side of the building. Such sign shall have the letters "FDC" not less than 6 inches (152 mm) high and words in letters not less than 2 inches (51 mm) high or an arrow to indicate the location. Such signs shall be subject to the approval of the fire code official.

IPMC Commentary

COMMENTARY AND CONSIDERATIONS

704.1

Fire protection systems currently in existing buildings, including sprinklers, standpipes, smoke detectors and fire alarms, are regulated by the IFC.

704.1.1

This section gives the code official the requirements for the inspection, testing and maintenance of fire sprinklers, fire pumps, standpipes, etc., on existing buildings. This information will be useful in areas where the property maintenance inspector is the individual verifying the requirements



704.1.2

The section acknowledges that fire department connections (FDCs) on existing buildings may not always be readily visible from the street or nearest point of fire department vehicle access. In those instances, the location of the connection must be clearly marked with signage. The FDC may be located on the side of the building or in an alley, not visible to arriving fire-fighting forces. A sign is necessary so that those driving the arriving apparatus know where to maneuver the vehicle to get close to the FDC. This language is also found in section 912.2.2 of the IBC.



Fire Protection Systems

SINGLE AND MULTIPLE STATION SMOKE ALARMS

Code Text

Single- and multiple-station smoke alarms shall be installed in existing Group I-1 and R occupancies in accordance with Sections 704.2.1 through 704.2.3.

704.2.1

Existing Group I-1 and R occupancies shall be provided with single-station smoke alarms in accordance with Sections 704.2.1.1 through 704.2.1.4. Interconnection and power sources shall be in accordance with Sections 704.2.2 and 704.2.3.

Exceptions:

1. Where the code that was in effect at the time of construction required smoke alarms and smoke alarms complying with those requirements are already provided.
2. Where smoke alarms have been installed in occupancies and dwellings that were not required to have them at the time of construction, additional smoke alarms shall not be required provided that the existing smoke alarms comply with requirements that were in effect at the time of installation.
3. Where smoke detectors connected to a fire alarm system have been installed as a substitute for smoke alarms.

704.2.1.1 Group R-1

Single- or multiple-station smoke alarms shall be installed in all of the following locations in Group R-1:

- In sleeping areas.
- In every room in the path of the means of egress from the sleeping area to the door leading from the sleeping unit.
- In each story within the sleeping unit, including basements. For sleeping units with split levels and without an intervening door between the 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 the upper level.



704.2.1.2 Groups R-2, R-3, R-4 and I-1

Single- or multiple-station smoke alarms shall be installed and maintained in Groups R-2, 3, R-4 and I-1 regardless of occupant load at all of the following locations:

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

704.2.1.3 Installation Near Cooking Appliances

Smoke alarms shall not be installed in the following locations unless this would prevent placement of a smoke alarm in a location required by Section 704.2.1.1 or 704.2.1.2.

- Ionization smoke alarms shall not be installed less than 20 feet (6096 mm) horizontally from a permanently installed cooking appliance.
- Ionization smoke alarms with an alarm-silencing switch shall not be installed less than 10 feet (3048 mm) horizontally from a permanently installed cooking appliance.
- Photoelectric smoke alarms shall not be installed less than 6 feet (1829 mm) horizontally from a permanently installed cooking appliance.

704.2.1.4 Installation Near Bathrooms

Smoke alarms shall be installed not less than 3 feet (914 mm) horizontally from the door or opening of a bathroom that contains a bathtub or shower unless this would prevent placement of a smoke alarm required by Section 704.2.1.1 or 704.2.1.2.

704.2.2 Interconnection

Where more than one smoke alarm is required to be installed within an individual dwelling or sleeping unit, the smoke alarms shall be interconnected in such a manner that the activation of one alarm will activate all of the alarms in the individual unit. Physical interconnection of smoke alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm. The alarm shall be clearly audible in all bedrooms over background noise levels with all intervening doors closed.

Exceptions:



1. Interconnection is not required in buildings that are not undergoing alterations, repairs or construction of any kind.
2. Smoke alarms in existing areas are not required to be interconnected where alterations or repairs do not result in the removal of interior wall or ceiling finishes exposing the structure, unless there is an attic, crawl space or basement available that could provide access for interconnection without the removal of interior finishes.

704.2.3 Power Source

Single-station smoke alarms shall receive their primary power from the building wiring provided that such wiring is served from a commercial source and shall be equipped with a battery backup. Smoke alarms with integral strobes that are not equipped with battery backup shall be connected to an emergency electrical system. Smoke alarms shall emit a signal when the batteries are low. Wiring shall be permanent and without a disconnecting switch other than as required for overcurrent protection.

Exceptions:

1. Smoke alarms are permitted to be solely battery-operated in existing buildings where no construction is taking place.
2. Smoke alarms are permitted to be solely battery-operated in buildings that are not served from a commercial power source.
3. Smoke alarms are permitted to be solely battery-operated in existing areas of buildings undergoing alterations or repairs that do not result in the removal of interior walls or ceiling finishes exposing the structure, unless there is an attic, crawl space or basement available that could provide access for building wiring without the removal of interior finishes.

704.2.4 Smoke Detection Systems

Smoke detection system. Smoke detectors listed in accordance with UL 268 and provided as part of the building's fire alarm system shall be an acceptable alternative to single- and multiple-station smoke alarms and shall comply with the following:

- The fire alarm system shall comply with all applicable requirements in Section 907 of the International Fire Code.
- Activation of a smoke detector in a dwelling or sleeping unit shall initiate alarm notification in the dwelling or sleeping unit in accordance with Section 907.5.2 of the International Fire Code.
- Activation of a smoke detector in a dwelling or sleeping unit shall not activate alarm notification appliances outside of the dwelling or sleeping unit, provided that a supervisory signal is generated and monitored in accordance with Section 907.6.5 of the International Fire Code.



IPMC Commentary

COMMENTARY AND CONSIDERATIONS

704.2

This section introduces the requirements for the installation of smoke alarms in existing Group I-1 and R occupancies. These requirements recognize the benefit of installing smoke alarms in existing structures, but provide several exceptions for buildings that are not undergoing substantial renovations. These provisions also correlate with Section 1103.8 of the IFC.

704.2.1

This section requires that Group I-1 and R occupancies without smoke alarms be provided with single station smoke alarms. Reference is made to Sections 704.2.1.1 through 704.2.1.4 for the primary location requirements. Three exceptions are also provided to address possible scenarios where smoke alarms have already been installed but the installation does not meet the current code requirements, recognizing that the intent of the code is to permit existing smoke alarm installations to continue unchanged where they meet the code that was in effect at the time they were installed.

Exception 1 indicates that smoke alarms which have been installed and maintained in accordance with the applicable code at the time of construction can continue unchanged.

Exception 2 indicates that smoke alarms, which were not required by the code at the time of construction, but were later installed, can continue when they meet the requirements of the applicable code at the time of installation. Exception 3 indicates that smoke detectors connected to a fire alarm system may be used in lieu of smoke alarms.

In summary, this section requires the installation of smoke alarms in Group I-1 and R occupancies that do not currently have any smoke alarms. It does not mandate compliance with current smoke alarm requirements if the building already has smoke alarms meeting the requirements applicable when they were installed. The focus here is not to have the owner replace or revise his or her smoke alarms any time the code requirements for new construction change.

704.2.1.1

Because the occupants of a sleeping unit or suite may be asleep and unaware of a fire developing in the room or in the egress path, single- or multiple-station smoke alarms must be provided in the sleeping unit and in any intervening room between the sleeping unit and the exit access door from the room. If the sleeping unit or suite involves more than one level, a smoke alarm must be installed on every level. See the commentary to the definition of "Sleeping unit."

Smoke alarms are required in split-level arrangements, except those that meet the conditions described in Item 3. In accordance with Section 704.2.2, all smoke alarms within a sleeping unit or suite must be



interconnected so that actuation of one alarm will actuate all smoke alarms within the sleeping unit or suite.

704.2.1.2

Because the occupants of a dwelling unit may be asleep and unaware of a fire developing in the room or in an area within the dwelling unit, which would affect their ability to escape, single- or multiple-station smoke alarms must be installed in every bedroom, in the vicinity of all bedrooms (e.g., hallways leading to the bedrooms) and on each story of the dwelling unit (the commentary to Section 202 for the definition of “Dwelling unit”).

If a sprinkler system was installed throughout the building in accordance with NFPA 13, 13R or 13D, if applicable, smoke alarms would still be required in the bedrooms even if residential sprinklers were used.

Smoke alarms are required in split-level arrangements. As required by Section 704.2.2, all smoke alarms within a dwelling unit must be interconnected so that actuation of one alarm will actuate the alarms in all detectors within the dwelling unit.

These provisions do not apply to one- and two-family dwellings and multiple single-family dwellings (townhouses) not more than three stories in height with a separate means of egress that are regulated by the IRC. The IRC is intended to be a stand-alone document. But, if the residential units do not fall within the scope of the IRC or for other reasons are intended to be subject to this code, then the requirements of this section would apply. International Fire Code Committee Interpretation No. 42-03 addresses this condition and contains additional explanatory information about the IRC and its relationship to the other International Codes.

Although the occupants of a sleeping unit in a Group I-1 occupancy may be asleep, they are still considered capable of self-preservation. Regardless, smoke alarms are required in sleeping units.

704.2.1.3

This section and the following section are intended to reduce nuisance alarms attributed to locating smoke alarms in close proximity to cooking appliances and bathrooms in which steam is produced. The provisions are consistent with similar requirements included in Section 29.8.3.4 of the 2010 and 2013 editions of NFPA 72.

704.2.1.4

See the commentary to Section 704.2.1.



704.2.2

The installation of smoke alarms in areas remote from the sleeping area will be of minimal value if the alarm is not heard by the occupants. Interconnection of multiple smoke alarms within an individual dwelling unit or sleeping unit is required in order to alert a sleeping occupant of a remote fire within the unit before the combustion products reach the smoke alarm in the sleeping area and thus provide additional time for evacuation.

The term “interconnection” refers to either hardwired systems or listed wireless systems. UL has listed smoke detectors that use this technology. It is presumed that on safely evacuating the unit or room of fire origin, an occupant will notify other occupants by actuating the manual fire alarm system or using other available means.

Exception 1 exempts buildings that are not undergoing any new work (alterations, additions, repairs, etc.) from providing interconnection between smoke alarms. This is to recognize that interconnection could require removal and replacement of interior finishes.

Exception 2 exempts areas of buildings that are not being altered or repaired to result in the removal of interior finishes. Where interior finishes are being removed, interconnection is required.

704.2.3

Smoke alarms are required to use AC as a primary power source and battery power as a secondary source to improve their reliability. For example, during a power outage, the probability of fire is increased because of the use of candles or lanterns for temporary light. Required backup battery power is intended to provide continued functioning of the smoke alarms. Smoke alarms are commonly designed to emit a recurring signal when batteries are low and need to be replaced.

Certain occupancies may already have an emergency electrical system in the building to monitor other building system conditions. The emergency electrical system provides a level of reliability equivalent to battery backup.

Exception 1 allows DC power operation only where no construction work is being done

Exception 2 allows DC power operation only where buildings do not have commercial electrical service.

Exception 3 allows DC operation only in areas of buildings that are not being altered or repaired to result in the removal of interior finishes. Where interior finishes are being removed, DC power will be required unless Exception 2 is met.



704.2.4

This section specifically allows the use of an automatic smoke detection system as an alternative to smoke alarms. In the past, when this concept was proposed, it was only specifically allowed through an alternative method and materials approach even though in concept it provides the same level of protection as smoke alarms. Such systems provide the same safety features necessary for occupants but are simply part of a fire alarm system. Note that if a detector activates within a sleeping or dwelling unit, the occupant notification system is not intended to activate. This is consistent with the operation of smoke alarms. Item 3 specifically requires the notification to be only to occupants of the sleeping unit or dwelling unit.

