

2014 Florida Residential Code Advanced 5th Edition: Overview – Internet

Table of Contents

Introduction	4
Course Overview	4
Code Administration & Enforcement	4
Scope	4
Dwellings, Townhouses & Accessory Buildings	5
Site Development	6
Fire Resistance Ratings of Exterior Walls	6
Soils & Site Drainage	8
Structural Design	10
Prescriptive & Performance	10
Loads	11
Foundation	15
Wood Framing	17
Fireblocking, Draftstopping & Deck Attachment	19
Attic Ventilation & Access	
Finishes & Weather Protection	
Interior & Exterior Finishes	
Health & Safety	
Ceiling Height & Means of Egress	
Stairways	
Windows & Glass	
Smoke Alarms & Fire Sprinkler Systems	
Fire-Resistance Rated Construction	
Dwelling Separation from Garage	
Fire Protection of Floors	
Illumination	
Mechanical Ventilation	
Building Utilities	
Appliance Installation & Location	
Fuel Gas Piping & Water Supply Protection	
Protection from Other Hazards	
Termite Control Methods	

Conclusion	. 37
Summary & Implications	. 37
Resources	. 38
References	. 38
Author Biography	. 39
John Farinelli, CBO, MCP, CFM, LEED AP	. 39

Note: This document is a transcript of the video course.

Introduction

Course Overview

Hello and welcome. This course will provide you with detailed information on the fundamental concepts of the 5th Edition of the Florida Building Code, Residential Volume. In addition to the Florida Code material, this course contains information from the Building Code Basics Residential Manual published by the International Code Council. This course examines basic concepts of the 5th Edition Florida Building Code Residential. It provides a basis for the correct use and application of the code and builds on an understanding of the intent of the code through practice with real world examples. Upon completion of this course you, will be able to successfully apply the critical concept provisions of the 5th Edition Florida Building Code Residential.

Hi, my name is John Farinelli with the International Code Council. I hold Florida licenses as a Building Code Administrator, Plans Examiner, and Inspector in all disciplines. I'm also licensed under Florida State Statute 633 as a Fire Inspector I. I am also certified from the International Code Council as an ICC Master Code Professional.

The 5th Edition of the Florida Building Codes are based on the 2012 edition of the International Codes.

By the end of this course you will be able to:

- Explain the fundamental provisions of the 5th Edition Florida Building Code Residential
- Locate general topics and applicable tables in the 5th Edition Florida Building Code Residential
- Define terms essential for correct code interpretation
- Identify the code changes that relate to the design, construction or inspection of residential buildings.

Code Administration & Enforcement

<u>Scope</u>

R101.2

In module one, we will discuss chapter one, Administration and Enforcement. You will notice that consistent with previous editions of the Florida Building Code Residential that chapter one is limited to the scoping provisions of the code and references chapter one of the building volume for the administration and enforcement of the Florida

Building Code Residential. It is important to note that the 5th edition of the Florida codes, as well as with all model codes, are a minimum set of requirements and provisions that regulate all buildings and structures.

The Florida Building Code Residential regulates one and two family dwellings and townhouse structures. The Residential Code combines all requirements for building, mechanical, fuel gas, plumbing and electrical into one document.

The provisions of the Florida Building Code Residential shall apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, removal and demolition of detached one and two family dwellings and townhouses not more than three stories above the grade plane with a separate means of egress, and their accessory structures.

There are exceptions to the scope of the residential code. Exception number one is for live-work units complying with the requirements of Section 419 of the Florida Building Code Building. They are recommended to be built as one and two family dwellings or townhouses. Fire suppression required by Section 419.5 of the Florida Building Code Building, when constructed under the Florida Building Code Residential, shall conform to Section P 2904 of the Residential Volume.

Exception number two is for owner occupied lodging houses with five or fewer guest rooms. They are permitted to be constructed in accordance with the Florida Building Code Residential when equipped with a fire sprinkler system in accordance with Section P 2904.

Exception number three is for existing buildings undergoing repair, alteration, addition or change of occupancy. They must comply with the Florida Building Code Existing Building Volume.

Dwellings, Townhouses & Accessory Buildings

R101.2

The building height and means of egress requirements of the Florida Building Code Residential apply equally to one and two family dwellings and townhouses. Although the code generally limits these residential buildings to three stories above ground level this still permits a full basement in addition to three stories above effectively creating a building with four floor levels. In addition, the code permits a habitable attic, which is not counted as a story, conceivably creating a fifth habitable level though such an installation is not common. Separate means of egress to the outdoors for each dwelling unit is required. One exterior exit door is required. The exit travel distance is not regulated and there is no limit on the size of the dwellings. Two family dwellings require fire resistant separation between the dwelling units.

R202

The code does limit the number of townhouses in a group of townhouses, but does require the building to satisfy certain other conditions. To qualify as a townhouse there must be at least three attached dwelling units and each unit must run from foundation to roof. That is, any portion of a townhouse is not permitted to be placed above any portion of another townhouse. Each townhouse must be separated by fire resistant rated construction and open to a yard or public way on at least two sides. Multifamily dwellings that do not meet the definition of townhouses fall under the provisions of the Florida Building Code, Building Volume. Note that the base code defines a townhouse as a single family dwelling unit constructed in a group of three or more attached units in which each unit extends from foundation to roof and with a yard or public way on at least two sides. The requirement for property lines between the townhouse units was added as a Florida specific amendment or FSA to the base code. Accessory buildings: The Florida Building Code Residential regulates accessory buildings. The use must be incidental and accessory to the dwelling. They are limited to a maximum of 3,000 square feet, a maximum of two stories, and they must be located on the same lot as the dwelling.

As it applies to the scope of Section R101.2, this term describes structures that are designed for accessory use to one or two family dwellings and multiple single family townhouses. These structures are commonly used as garages, carports, cabanas, storage sheds, tool sheds, playhouses, and garden structures.

Site Development

Fire Resistance Ratings of Exterior Walls

R302

The code regulates a building's location on the property primarily to guard against the spread of fire to new buildings on the property being developed and to prevent the spread of fire to buildings on adjacent property.

Provisions that regulate the construction of exterior walls in proximity to a lot line have long been recognized as effective in preventing the spread of fire from a building on one property to a building on another property. Protection can be achieved by providing a clear space between the building and the lot line or by using fire resistant rated construction. The code does not prohibit placing a building with zero clearance to the lot line provided the exterior wall meets the prescribed fire resistance requirements. When the building is set a certain distance away from the lot line, fire resistance is not required. For dwellings and townhouses protected with an automatic fire sprinkler system, this minimum separation distance is three feet. For dwellings without sprinkler systems and for detached accessory buildings the minimum separation between the unrated wall and the lot line is five feet. Note that the fire separation distance is also measured from the center line of a street or alley.

R302.1

The code recognizes the benefits provided by automatic fire sprinkler systems and allows a reduction in the required fire distance rating of exterior walls. For both sprinkled and non-sprinkler dwellings, walls perpendicular to the property line do not require fire protection. For dwellings not equipped with fire sprinklers, walls located less than three feet from a property line requires one-hour fire rated walls with no openings permitted. Walls located less than five feet to three feet from a property line require one-hour fire-rated walls with openings limited to 25% of the area of the wall. Walls located five feet or more from a property line allows for non-rated construction with unlimited openings permitted. For dwellings not equipped with fire sprinklers, walls located three feet or more from a property line allows for non-rated construction with unlimited openings permitted.

Projections, typically roof overhangs, require one-hour fire protection on the underside when less than the prescribed distance from the lot line. For dwellings without fire sprinklers, no protection is required for eave projections with a fire separation distance of five feet or greater. When the eave projection fire separation distance is two feet to five feet, the underside of the soffit is required to have a minimum fire resistance rating of one hour. For dwellings with fire sprinklers, no protection is required for eave projections with a fire separation distance of three feet or greater. When the eave projection fire separation distance is three feet to five feet, the exterior wall and underside of the soffit are required to have a minimum fire resistance rating of one hour.

When the eave projection fire separation is two feet to less than three feet, the underside of the soffit is required to have a minimum fire resistance rating of one hour. Generally eave projections cannot project closer than two feet from the lot line. However, an exception permits a detached garage located within two feet of the lot line to have a four inch roof eave projection.

Soils & Site Drainage

R401

Site preparation. Two basic provisions:

- 1) soil characteristics as they relate to the support and stability of the foundations, and
- 2) grading to provide surface drainage away from foundations.

R403.1.4

General requirements. Exterior footings must be a minimum of 12 inches below the undisturbed ground level.

Preparation of the site for construction includes stripping of vegetation and top soil, grading to the rough contours if necessary, and excavation for basements and foundations. The code requires that all exterior footings be placed at least 12 inches below the undisturbed ground level. All footings must bear on natural soil or compacted engineered fill.

Unified Soil Classification System Symbol	Soil Description	Load Bearing Pressure (psf)	Drainage Characteristics	Frost Heave Potential	Volume Change Potential Expansion
GW	Well-graded gravels, gravel sand mixtures, little or no fines	3000	Good	Low	Low
GP	Poorly graded gravels or gravel sand mixtures, little or no fines	3000	Good	Low	Low
SW	Well-graded sands, gravelly sands, little or no fines	2000	Good	Low	Low
SP	Poorly graded sands or gravelly sands, little or no fines	2000	Good	Low	Low
GM	Silty gravels, gravel-sand-silt mixtures		Good	Medium	Low
SM	Silty sand, sand-silt mixtures	2000	Good	Medium	Low
GC	Clayey gravels, gravel-sand-clay mixtures		Medium	Medium	Low
SC	Clayey sands, sand-clay mixture	2000	Medium	Medium	Low
ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	1500	Medium	High	Low
CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	1500	Medium	Medium	Medium to Low
СН	Inorganic clays of high plasticity, fat clays	1500	Poor	Medium	High
МН	H Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts		Poor	High	High

R405.1

While the code does not mandate geotechnical soils testing, the building official is authorized to require a geotechnical evaluation and report prepared by an approved

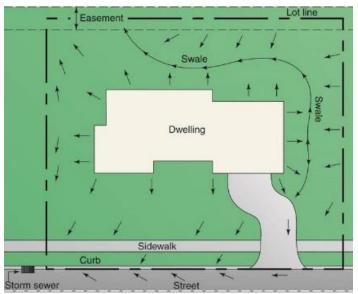
agency. The building official may assume conservative values based on the average of the lowest soil characteristics likely to be encountered on a site. Soil type is verified at the time of footing inspection. If found to be of a poorer grade than presumed, testing or mitigation is required prior to placing concrete footings. The builder always has the option of providing the results of soil testing in a geotechnical report in order to use a higher load-bearing value than would otherwise be presumed.

R401.2

Engineered fill is required for over-excavation to remove unsuitable soils. When additional material to raise the elevation of the footings above the existing undisturbed soil is required.

An engineered fill must be designed by a registered design professional. It must be installed as specified in the design requirements and must be tested as specified in design requirements.

Over-excavation to remove unsuitable soils or the addition of material to raise the elevation of the footings above the level of the natural undisturbed soil requires engineered fill material to support the footings and foundation. A registered design professional is responsible for the design and placement of the fill material in



accordance with accepted engineering practice. The engineered fill must be installed and tested in conformance with the design requirements. Fill materials are typically sand, crushed rock, clean gravel or a mixture of granular materials.

R401.3

For storm drainage, the final grade must fall a minimum of six inches within 10 feet of the foundation. There is an exception for local site

conditions where water can be directed to a swale or to drains. Any concrete surfaces within 10 feet of the foundation need a two percent slope.

Structural Design

Prescriptive & Performance

Table R301.2 (1), Climatic and Geographic Design Criteria: When the Florida Building Code Residential is adopted, the jurisdiction completes the table with data applicable to the jurisdiction. For example, ground snow load must be shown. Wind design: the wind speed in miles per hour and any topographic effects must be identified. Wind design data both in wind speed and miles per hour and any topical effects; the seismic design category must be specified; any area subject to damage from weathering, frost line depth and termites; the winter design temperature; Ice barrier requirements; Flood hazards must also be identified; The air freezing index is to be specified and the annual mean temperature. Note that the data shown is specific to Florida and has been carried forward from the 2010 edition of the code.

The intent of the code is to provide comprehensive but easy to use minimum standards for the conventional construction of residential buildings and at the same time provide the greatest design flexibility in recognizing other methods and materials of construction.

Prescriptive design is like following a specific recipe. Prescriptive means a set of rules the builder may follow to ensure that the building complies with the code. Performance means an expectation that the building system will function in a certain way to meet the minimum requirements of the code. In terms of the structural requirements performance is typically achieved through engineering.

When using the conventional or prescriptive construction provisions, an engineered design is necessary for only those structural elements that exceed the limits in the code or are otherwise not included in the prescriptive provisions of the code such as the sizing of wide-flanged steel beams.

The code permits for alternate framing methods. Wood framing is required to comply with the provisions of the American Forest and Paper Association, *Wood Frame Construction Manual for One and Two Family Dwellings*.

Cold-formed steel framing is permitted to comply with the American Iron and Steel Institute AISI S230 Standard for Cold-formed Steel Framing-Prescriptive Method for One and Two Family Dwellings.

Log homes can be constructed using the *ICC 400 Standard, Design and Construction of Log Structures.* Engineered design in accordance with the Florida Building Code, Building Volume is required when a building exceeds the applicability limitations of these standards.

R301.2.1.1.1

The Guide to Aluminum Construction in High Wind Areas is an accepted design manual. The use of this manual has been carried forward from the previous edition of the code.

<u>Loads</u>

R301.5

USE	LIVE LOAD (psf)
Uninhabitable attics with limited storage	20
Habitable attics and attics served with fixed stairs	30
Balconies (exterior) and decks	40
Fire escapes	40
Guardrails and handrails	200
Guardrail in-fill components	50
Passenger vehicle garages	50
Rooms other than sleeping rooms	40
Sleeping rooms	30
Stairs	40

Florida Building Code Residential Table R301.5, Minimum Uniformly Distributed Live Loads. Building construction must safely support all loads, meaning the forces acting on the building.

Gravity loads refer to the weight of objects bearing down on the structure and include live loads, dead loads and roof loads. Live loads are the variable loads related to the use of the structure such as people and furniture.

Design for bedroom areas assume a uniform floor live load of not less than 30 pounds per square foot and all other living areas of a dwelling require a minimum live load of 40 pounds per square foot.

R301.4

Dead loads are permanent in nature and include the weights of all construction materials and fixed equipment incorporated into the building. Average dead loads are included in the prescriptive tables for footings, floors, walls and roofs. Therefore, when utilizing the prescriptive provisions of the code, additional calculations are typically not required.

R301.7

Allowable deflection in structural framing members such as studs, joists and beams is a way to ensure adequate stiffness when such member are subjected to bending under code prescribed loads. For floor joists, this may be understood as the "bounce" or give in the floor system as the person walks across a room. A design for less deflection will translate to more stiffness and, therefore, less bounce in the floor. The code sets limits on the maximum allowable deflection depending on the type of member involved. The code permits greater deflection, for example, in ceiling joints and rafters than in floor joists.

Structural Member	Allowable Deflection
Rafters having slopes greater than 3:12 with no finished ceiling attached to rafters	<i>L</i> /180
Interior walls and partitions	<i>H</i> /180
Floors/ceilings with plaster or stucco finish	<i>L</i> /360
All other structural members	<i>L</i> /240
Exterior walls—wind loads with plaster or stucco finish	<i>H</i> /360
Exterior walls with other brittle finishes	<i>H</i> /240
Exterior walls with flexible finishes	<i>H</i> /120
Lintels supporting masonry veneer walls	<i>L</i> /600

Let's look at an example for floor joist deflection. Our floor joist span is 14 feet. The allowable deflection from Table R301.7 is *L* over 360. Our formula *L* equals 14 feet times 12 inches equals 168 inches. 168 divided by 360 equals 0.47. So, therefore the

allowable deflection is 0.47 inches. Note that a 14 foot span rafter with a 4:12 slope and no ceiling attached has an allowable deflection of L over 180, which is twice the deflection allowed for floor joists.

R301.2.1.1

In addition to supporting the live and dead loads, the building must safely resist environmental load effects such as wind, snow, earthquake and flood hazards. These forces may be vertical or lateral and are also referred to as loads.

With the exception of concrete construction and structural insulated panels, the prescriptive provisions of the code do not apply to the design of buildings where the ultimate design wind speeds equals or exceeds 115 miles an hour. Under the Florida Building Code Residential, when designing a building for wind loads the use of the conventional light frame construction provisions is limited to areas with maximum ultimate wind speed of 114 miles an hour. Wind forces exceeding 114 miles per hour must use one of the following for design: Wood Framing Construction Manual, the ICC 600 standard for residential construction in high wind regions. The Florida Building Code, Building Volume or ASCE 7, Minimum Design Loads for Buildings and Other Structures.

R301.2.1.4

Exposure categories are important design criteria for the engineering of buildings or portions of buildings resisting the effects of wind, and such criteria should appear on engineering submittal documents.

Exposure B: Urban and suburban areas, wooded areas, or other terrain with numerous closely spaced obstructions having the size of single family dwellings or larger.

Exposure C: Open terrain with scattered obstructions having heights generally less than 30 feet includes flat open country and grasslands. Applies for all cases where exposures B or D do not apply.

Exposure D: Flat, unobstructed areas and water surfaces including shorelines in hurricane prone regions.

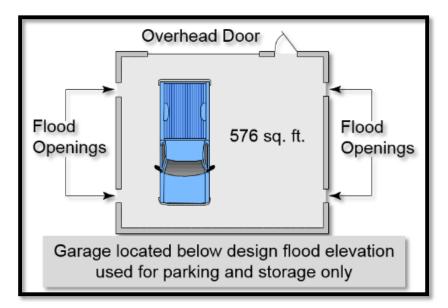
In addition to wind loads, protection is required for exterior glazing in hurricane areas designated as wind borne debris regions. Florida Building Code Residential defines the wind borne debris region as areas where the basic or the ultimate wind speed is 140 miles per hour or greater or areas where the basic or ultimate wind speed is 130 miles per hour and within one mile of the coast.

R301.2.1.2

In hurricane prone regions designated as wind borne debris regions, glazing must be protected with approved impact resistant coverings. These devices must meet the testing standards prescribed in the code for large and small missile impact. The applicable standards are ASTME 1996, ASTME 1886, SSTD 12, TAS 201, 202 and 203, AAMA 506. Garage doors with glazing must meet the requirements of ANSI/DASMA 115. The code also contains prescriptive provisions for the use of wood structural panels.

R322

The code requires flood resistant construction for buildings located in flood hazard areas to minimize damage. Primary protection is achieved through elevation of the lowest floor of the building above the design flood elevation. Basements and spaces used only for storage or vehicle parking are permitted below the design flood elevation. Such enclosed areas require flood openings to allow flood waters to flow through the space and equalize hydrostatic pressure on both sides of the enclosing walls. Doors and windows do not satisfy flood opening requirements. The code contains prescriptive provisions for flood relief openings. Two openings are required on different sides of the building. One square inch of opening per one square foot of enclosed area is required. The bottom of each opening can be no more than 12 inches above grade.



Let's look at an example. We have a garage of 576 square feet. Therefore, a total of 576 net square inches of relief opening is required. With four openings provided, each opening is required to provide a minimum of 144 square inches.

Foundation

R402

The two most common materials for foundation construction are concrete and concrete block, the latter more precisely described as concrete masonry units or CMUs. The code does not intend to limit the use of different materials. In addition to prescriptive designs for other foundation systems incorporating wood, precast concrete or insulating concrete forms, the code permits engineered or alternate designs.

R403

For other than engineered soil conditions, footings must bear on undisturbed ground and extend below the frost depth to provide a stable foundation. In addition, exterior footings require excavation to at least 12 inches below the undisturbed soil. Vegetation, wood, debris, loose or frozen soil, and any other detrimental materials must be removed prior to replacing the concrete.

R404

	Load-Bearing Value of Soil (psf)				
	1,500	2,000 3,000		<u>≥</u> 4,000	
	Conventional	Light-Frame	Construction	l	
1-story	12	12	12	12	
2-story	15	12	12	12	
3-story	23	17	12	12	
4" Brick Ve	4" Brick Veneer or Light Frame of 8" Hollow Concrete Masonry				
1-story	12	12	12	12	
2-story	21	16	12	12	
3-story	32	24	16	12	
8" Solid or Fully Grouted Masonry					
1-story	16	12	12	12	
2-story	29	21	14	12	
3-story	42	32	21	16	

Size of Footings – Concrete or Masonry: Note the different presumptive soil load bearing values. Note the type of construction permitted. Compare the differences based on the number of stories. Note that the width applies to the base of the footing, the load bearing surface. Next determine the dimension T, thickness, which must be a minimum of six inches. Then, determine the dimension P, projection, which must be a minimum of two inches, but never greater than the thickness T.

R403.1.6

Seismic Design Categories range from Design Category A, representing the lowest level of seismic hazard to Seismic Design Category E, representing the highest hazard. Florida falls entirely into Seismic Design Category A.

Prescriptively, when anchoring wood sill plates to concrete or masonry foundations, the code generally requires a minimum of two anchor bolts in each section with an exception for offsets less than 24 inches. One quarter inch thick, three inch by three inch plate washers and bolt spacing of four feet or less for anchorage of three story buildings is required. Anchorage to the foundation is a critical part of the load path to resist lateral and uplift forces acting on the framing system of the building.

R404.1.2

Unlike footings where gravity loads are the primary consideration, foundation walls must be constructed to resist lateral loads, particularly from soil pressure. Therefore, the soil type, the height of the foundation, and the height of unbalanced backfill determine the wall thickness and reinforcement of masonry and concrete foundation walls without consideration of the height or number of stories of the dwelling.

R408

Depending on climatic conditions, significant amounts of condensation can accumulate in an enclosed crawl space causing decay and other damage to the structure. The code requires ventilation openings through the foundation or exterior walls in the prescribed size and location to circulate air and dissipate condensation. An alternate method permits a crawl space without foundation openings when equipped with mechanical exhaust ventilation or connection to the conditioned air supply of the dwelling.

In this case, the code requires installation of the exterior walls and a vapor retarder over the ground and seal to the enclosing foundation wall. However, this method cannot be used in designated flood hazard areas due to the previously discussed requirements for flood relief openings. The code requires access to the underfloor space. Access openings through the floor must be at least 18 inches by 24 inches but may be reduced to not less than 16 inches by 24 inches when access is through a perimeter wall.

Wood Framing

R602

The repetitive system of wood or cold-formed steel framing members forming the structural elements of a floor, wall and roof construction is referred to as light frame construction.

Load bearing dimensional lumber for framing members in wood structural panels must be defined by a grade mark. Sawn lumber grade marks indicate the wood species, grade, moisture content, grading agency, and lumber mill identification. Species in grade determine in part the strength and stiffness properties that establish the maximum permissible spans for wood beams, joists and rafters. Wood structural panel grade marks indicate the panel grade, the span rating for roofs and floors, the panel thickness, exposure durability classification, mill number, product standard, and evaluation service report.

The code permits the use of engineered components in otherwise prescriptive conventional framing systems. These engineered components must be designed in accordance with approved engineering practice and the applicable reference standards. Installation of engineered wood products must conform to the manufacturer's installation instructions.

R802.1.7

In addition to the structural design criteria, truss design drawings include manufacturing and installation specifications for each truss. The code requires the manufacturer or contractor to submit the truss design drawings to the building official for review and approval prior to truss installation. Because they contain permanent bracing details, nailing specifications for bracing, and multiple member trusses and minimum bearing and other important installation information, the truss design drawings must also be delivered to the job site with the trusses.

R317.1

An approved quality mark or label is required on preservative treated lumber and plywood indicating that the product meets the standards of the American Wood Protection Association.

R317.1

Naturally durable or preservative treated wood is required for beams, joists and decking. Preservative treated wood suitable for ground contact is required for structural supports that are in contact with the ground, embedded in concrete in contact with the ground or embedded in concrete exposed to the weather. Naturally durable wood is not permitted in these ground contact locations.

The code prescribes minimum ground clearance dimensions for non-treated wood. When the minimum dimensions cannot be met the use of naturally durable or preservative treated wood is required.

R502.1.11 & R802.1.8.1

In order to maximize the structural strength and integrity of wood framing, the code limits the amount and location of bored holes and notches in dimensional lumber.

Notches at the end of the member are limited to one fourth the depth of the member. Other notches in solid number, joists, rafters and beams cannot be located in the middle one-third of the span and are limited to 1/6 of the depth of the member and not longer than one-third of the depth of the member. The diameter of holes bored or cut into members cannot exceed one-third the depth of the member. Holes cannot be closer than two inches to the top or bottom of the member or to any other hole located in the member. Where the member is also notched, the hole cannot be closer than two inches to the notch.

Additionally, the tension side of members with a thickness of four inches or more can be notched at the ends only.

R602.2.3

Any stud in an exterior wall or bearing partition may be cut or notched to a depth not exceeding 25% of its width. A stud may be bored or drilled provided that the diameter of the resulting hole is no more than 40% of the stud width, the edge of the hole is no more than 5/8 inch to the edge of the stud, and the hole is not located in the same section as a cut or a notch. Studs located in exterior walls or bearing partitions drilled over 40% and up to 60% must also be doubled with no more than 2 successive doubled studs bored.

Studs in non-bearing partitions may be notched to a depth not to exceed 40% of a single stud width. Again, note that any stud may be bored or drilled provided that the diameter of the resulting hole is no more than 60% of the stud width, the edge of the hole is no more than 5/8 inch to the edge of the stud, and the hole is not located in the same section as a cut or notch.

Let's check the maximum hole size permitted in a two by four stud. The stud depth or width is 3 and 5/8 inch. The largest hole permitted cannot exceed 60% of the stud depth. Sixty percent times 3 and 5/8 equals 2 and 1/8. Five-eighths plus 2-1/8 plus 5/8 equals 3-3/8. As you can see, the 60% bore in a two by four stud in a non-bearing wall still leaves the 5/8 inch clearance to each edge, but, the tolerance is very close. It is only plus or minus 1/8 of an inch.

R602.2.3.1

When piping or duct work is placed in or partly in an exterior wall or interior load bearing wall necessitating cutting, drilling or notching of the top plate by more than 50% of its width, a galvanized metal tie not less than 0.054 inch thick or 16 gauge and an inch and a half wide must be fastened across and to the plate at each side of the opening, with not less than eight 10 penny nails having a minimum length of 1-1/2 inch at each side or equivalent. The metal tie must extend a minimum of six inches past the opening.

Fireblocking, Draftstopping & Deck Attachment

R302.11

Concealed spaces of stud walls and partitions require fireblocking vertically at the floor and ceiling levels. Fireblocking is also required at all interconnections between concealed vertical and horizontal spaces, such as those created by soffits and at the top and bottom of stair stringers. Fireblocking materials include nominal two inch thick lumber, equivalent layers of structural wood panels, and glass fiber insulation securely retained in place.

Openings to ground vents, pipes, ducts, cables and wires must also be sealed at the ceiling and floor level.

R302.12

When a ceiling is applied to the bottom side of open web floor trusses, or large areas of communicating spaces are otherwise created in a floor assembly, the code requires draftstopping to divide the horizontal spaces into areas of 1,000 square feet or less. Half inch gypsum board and 3/8 inch wood structural panels are approved draftstopping materials.

R507

The code provides prescriptive methods for attaching a deck to the dwelling to safely resist the applicable loads.

The connection details apply to a minimum two by eight preservative treated deck ledger attached to a two inch nominal solid sawn lumber band joist or a minimum one inch by 9-1/2 inch Douglas fir laminated veneer lumber rim board. Attachment to other structural composite lumber band joists requires a design in accordance with accepted engineering practice. Fasteners must be minimum 1/2 inch diameter hot dipped galvanized or stainless steel lag screws or bolts installed with washers of the same material. The maximum spacing is based on deck joist span and long enough to provide full depth penetration through the rim joist. The code requires a staggered fastener pattern with the bolts or lag screws located not less than two inches from the top edge and not less than 3/4 inch from the bottom edge of the deck ledger and from two to five inches from the ends of the ledger.

Attic Ventilation & Access

R806.1 & R807.1

The code requires cross ventilation for each attic or enclosed roof space to prevent moisture from accumulating in the space and causing damage to the structure. In poorly ventilated attics, warm moist air escaping from the conditioned space condenses on the framing and sheathing of the cooler attic space. The total net free ventilating area must be at least 1/150 of the area of the space. A reduction to 1/300 of the area of the space is permitted when 40% to 50% of the required ventilating area is in the upper portion of the space, with the balance of the ventilating area provided by eave or cornice vents. This reduction is also permitted for attics in cold climates when a vapor retarder is installed on the warm-in- winter side of the ceiling. Unvented attics are permitted under certain conditions.

Access to the attic is required when the attic area exceeds 30 square feet and has a height of 30 inches or greater. The attic requires a rough opening of at least 22 by 30 inches with head room above the opening of at least 30 inches high. The access opening must be located in a hallway or other readily accessible location.

Finishes & Weather Protection

Interior & Exterior Finishes

R702

The code includes minimum installation requirements for gypsum board, plaster, ceramic tile, and wood paneling for walls and ceilings. Inspection is not specifically

required for other than attachment of lath or gypsum board that is part of a fire resistant rated assembly.

R703

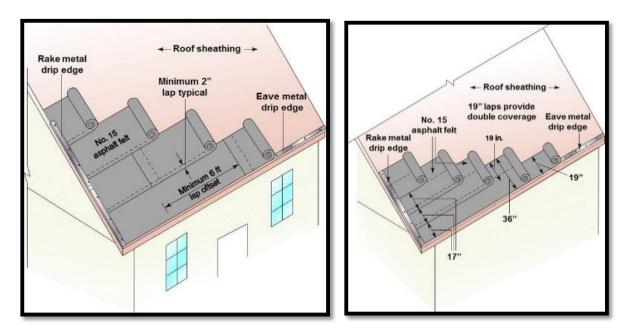
Water resistant barriers, flashing, windows, doors and siding or veneers form the protective exterior wall envelope of a dwelling. In wood or steel light frame construction for other than detached accessory buildings, the code requires a water resistant barrier over the sheathing of all exterior walls. Siding and veneers are typically not impervious to wind driven rain, and the water resistive barrier in combination with flashings completes the weather protective system to keep moisture out of the wall assembly.

The code prescribes one layer of number 15 asphalt felt applied horizontally with two inch laps for the water resistant barrier, but approved house wrap and other materials tested to perform equivalently to the felt satisfy the requirement. House wraps must be installed in accordance with the manufacturer's instructions to shed water away from the sheathing to the outside of the wall coverings. Flashing and exterior siding or veneer completes the drainage plane assembly.

R903

The code prescribes the design, materials, construction, and quality of roofing assemblies to provide weather protection for the building. Roof coverings must be installed according to the code and the manufacturer's instructions.

At a minimum, for slopes of 4:12 or greater, one layer of 15 pound asphalt saturated organic felt or other approved material is required to cover the roof deck before application of roof covering. To effectively seal against the entry of water, flashing is required at roof and wall intersections, at points of change in slope or direction, and around roof openings or penetrations. Upon complete underlayment and flashing installation, the roof covering can be installed.



R905.2.7

This illustration shows the basic installation requirements for asphalt shingle underlayment using 15 pound organic felt. For low slope roofs, two layers of underlayment are required. For roofs with a slope of 4:12 or greater, one layer of underlayment is sufficient. Low slope roofs require a minimum 19 inch horizontal lap. For roofs with a slope of 4:12 or greater, a minimum two inch horizontal lap is sufficient. End laps must be offset by six feet or more. Although vertical laps are not shown, the separation of six feet still applies.

Health & Safety

Ceiling Height & Means of Egress

R305

Adequate ceiling height contributes to a healthy living environment and provides the ability to move about and safely exit the building.

The general rule establishes a minimum ceiling height of seven feet for all usable spaces of a dwelling other than closets. The code allows for slope ceilings, provided that half of the required room area accommodates the seven foot height. Reductions are also permitted in certain areas of basements and bathrooms.

R311

Means of egress describes the path of travel from any location in the dwelling to the exterior. The code regulates stairways, ramps, hallways and doors as the primary components of that path for a safe exit from the building.

Hallways must have a clear width of three feet, and one exterior exit door is required, also a nominal three feet in width. Otherwise, the code does not regulate the size or type of doors or limit the travel distance from any portion of the dwelling unit to the required exit. Note that a Florida specific amendment to the base code exempts buildings that are 400 square feet or less and attended for use in conjunction with one or two family residents from the door height and width requirements.

As a measure for protecting the path for safe exit from the building, the code requires limited fire resistance on the underside of the stairs when the space below is enclosed. Protection is achieved by applying 1/2 inch gypsum board on the enclosed side. Occupants in any location of the dwelling must be provided with a route to the required exit door without passing through a garage. In addition, elements on the exterior side of an exit door, such as a deck or porch, must be securely anchored to the structure.

Another important element along the path of egress is the ability of the occupant to open the required exit door without a key or special knowledge. This precludes the use of a double-keyed deadbolt.

R311.2 & R311.3

For each dwelling unit, the code requires one side hinge exterior exit door providing a net clear opening of 32 inches by 78 inches. This is typically achieved with the installation of a door with nominal measurements of three feet by six feet eight inches.

A landing or floor is generally required on each side of an exterior door with a maximum threshold height above the landing of one and one half inches. Landings must be at least as wide as the door and not less than 36 inches in the direction of travel. An exception allows the exterior landing at the required exit door to be not more than 7-3/4 inches below the top of the threshold, provided that the door swings in.

For other exterior doors, a landing or floor is generally required on each side of exterior doors with a maximum threshold height above the landing of 1-1/2 inches. Exterior landings cannot be more than 7-3/4 inches below the top of the threshold and the door can swing in either direction. Landings must be at least as wide as the door and not less than 36 inches in the direction of travel.

A stair without a landing is permitted outside a door other than the required exit door if the door swings in and the stair has only two risers.

Stairways

R311.7

The code endeavors to improve stair safety and prevent injuries from falls by limiting the slope of the stair and by providing for minimum tread size, clearances, uniformity, and graspable handrails.

The maximum 7-3/4 inch risers and minimum 10 inch treads with a nosing projection determine the maximum steepness of the stairway. Note that there is an exception to the required nosing when the stair rise is 30 inches or less and the tread run is a minimum of 11 inches.

Also important in stair safety is the uniformity of those treads and risers for the full flight of the stair. As a person walks a stair, he or she anticipates that the next step will be the same as the previous one. Variations that are not usually apparent may break the user's rhythm or otherwise cause a mid-step and fall. Headroom must be a minimum of six feet eight inches measured from the nose of the treads.

Stairs require a minimum clear width of 36 inches above the handrail below the required headroom height. Handrails are permitted to project a maximum of 4-1/2 inches into the clear width and are not considered an obstruction when mounted at a height of between 34 and 38 inches above the nose of the tread.

R311.7.5.2.1

Winder treads have non-parallel edges and the code permits a tread depth of six inches at the narrow end, provided the full tread depth of 10 inches is achieved within 12 inches of the narrow side.

A person walking on winder treads and holding the handrail will typically be positioned 12 inches from the narrow side. This is referred to as the walk line and this configuration allows a turn in the stairway without a landing and without creating an undue hazard.

R311.7.6

Similar to the general rule requiring landings at exterior doors, in most cases a floor or landing is required at the top and bottom of stairs. This is usually not an issue unless a door is installed to enclose the stairway or the stairway opening is framed too close to a wall. The landing requirement prevents the installation of a door in close proximity to the bottom tread. Such an installation would create not only a headroom problem but a falling hazard as well. An exception to the landing requirement allows a door at the top of an interior flight of stairs, provided the door does not swing out over the step.

R311.7.8

Handrails are a critical component of stair safety. To be effective, they must be placed 34 to 38 inches above the tread nosing, be continuous, securely anchored and have a shape that is easily graspable and held.

R312

The code generally requires a minimum 36 inch height guard as protection against falling from a walking surface to a lower surface that is more than 30 inches below. In determining where a guard is required, the vertical distance from the walking surface to the grade or floor below is measured from the lowest point within 36 inches horizontally from the edge of the open-sided walking surface. The minimum guard height is usually measured from the walking surface. But for guards located adjacent to fixed seating, the minimum 36 inch height is measured above the seat and intends to protect children playing or climbing on the seat from falling over the guard. At the side of stairs, the minimum guard height is reduced to 34 inches to correlate with the minimum handrail height.

Guards must also be constructed in such a way that a four inch sphere will not pass through, a dimension determined after lengthy research to prevent small children from maneuvering through or becoming entrapped in such a barrier. The code grants two exceptions for the sides of stairs. The first increases the dimension to a six inch sphere at the triangle formed by the tread riser and the bottom rail because of the impracticality of reducing the triangle and the negligible hazard. The second stipulates that a 4-3/8 inch sphere cannot pass through a guard on the sides of the stairs, a measurement that accommodates a practical wood spindle layout for staircases. The top rail must be able to resist a single concentrated load of 200 pounds applied in any direction and the infill components must be able to resist a 50 pound horizontal load, apply to an area of one square foot.

Windows & Glass

R312.2.1

The minimum window sill height requirements are intended to reduce the number of injuries to children from falls through open windows.

The code regulates the minimum sill height only when the window opening is more than 72 inches above grade below. As an alternate, fixed glazing may be installed to raise the sill level to required minimum 24 inch sill height.

Other alternatives include the use of a window fall prevention device meeting the requirements of the reference standard, ASTM F2090, or an approved window opening control device conforming to the same standard may also be used to satisfy the sill height provisions. This type of device limits the opening size so that a four inch sphere cannot pass through.

The code references ASTM F2090 for both window opening control devices and window fall prevention devices. An important aspect of both types of devices is the requirement in the standard for a release mechanism for emergency escape, a provision that is in effect for either device installed at any window whether or not the window is required to be an emergency escape and rescue opening.

R310.1

One of the most important safety provisions in the code concerns openings for emergency escape and rescue. These openings provide alternate means to escape from a sleeping room or basement in the event that a fire or other emergency blocks the usual path of egress. They allow occupants to escape directly to the safety of the outdoors and allow rescue personnel fully equipped with breathing apparatus to enter the room from the outside.

All three window designs shown meet the code requirements for emergency escape and rescue openings as follows: Minimum width of 20 inches, minimum height of 27 inches, minimum area of 5.7 square feet. Note that an exception reduces the clear area to five square feet for windows installed at grade level.

R308

To prevent serious injury from shards of breaking glass, the code identifies seven specific locations as subject to impact by people and therefore hazardous for the installation of glazing.

- 1. Glass in doors,
- 2. Glass adjacent to doors,
- 3. Large windows close to the floor,
- 4. Glass installed in guards and railings,
- 5. Bathtub areas,
- 6. Glass adjacent to stairs and ramps, and
- 7. Glass adjacent to the bottom of the stair landing.

Safety glazing, typically tempered or laminated glass, must pass the test requirements and be classified in accordance with the applicable reference standard based on the location of the glazing. Polished wire glass is not permitted in hazardous locations requiring fire resistance unless it has received approved classifications through testing.

Smoke Alarms & Fire Sprinkler Systems

R314

Occupants are most vulnerable to the hazards of fire while sleeping. Detection and notification in the early stages of a fire provide residents with needed time to escape before the interior environment becomes intolerable.

The code requires a smoke alarm in each sleeping room, outside each sleeping area, and on each additional story of the dwelling unit including basements and habitable attics. The code also stipulates that the building wiring system provides the primary power to the smoke alarms and that battery supply backup power when primary power is interrupted. Interconnection of the devices is also required. Smoke alarms must be listed as conforming to UL 217, Single and Multiple Station Smoke Alarms.

R314.3.1

The code also regulates smoke alarms for existing dwellings when interior alterations or repairs requiring a building permit occur or when an addition is constructed. In these cases, the building must be brought into conformance with the smoke alarm requirements for new buildings. If there are practical difficulties in installing wiring to the devices without damaging existing finishes, the code allows battery-operated smoke alarms without interconnection. The smoke alarm provisions do not apply in the case of minor work that does not require a permit for exterior renovations or for the addition of a deck or porch.

R314.4

Note that a Florida specific amendment to the base code applicable to one and two family dwellings and townhomes undergoing a repair or Level One Alteration as defined in the Florida Building Code, may use smoke alarms powered by a 10 year non-removable, non-replaceable battery in lieu of retrofitting with smoke alarms powered by the dwellings electrical system.

P2904

The installation of fire sprinklers in one and two family dwellings and townhomes continues to be optional under the 5th edition of the Florida Building Code Residential Volume. Section P2904 provides a simple prescriptive approach to the design of dwelling fire sprinkler systems and is an approved alternative to NFPA 13D, which

allows for engineered design options and other piping configurations. Consistent with structural and other design provisions in the code, the prescriptive method allows contractors, plumbers, and homeowners to design and install a dwelling sprinkler system while still providing the flexibility of an engineered design in accordance with NFPA 13D.

Fire-Resistance Rated Construction

R302.3

Fire resistance rated construction limits the spread of fire to protect property and occupants, and provides time for effective firefighting efforts. The components of the wall or floor-ceiling construction form an assembly that has proven through testing to resist the effects of fire for the designated time period.

The code requires a one hour fire resistance rated separation between the dwelling units of a two family dwelling. Horizontal floor- ceiling assemblies separating upper and lower units must extend to the exterior walls and supporting wall construction must also be one hour fire resistance rated.

Wall assemblies separating side by side units must generally extend from the foundation through the attic space to the bottom of the roof sheathing.

As an alternative, the code permits the wall assembly to terminate at a 5/8 inch gypsum board ceiling when a draft stop is installed in the attic area and not less than 1/2 inch gypsum board is installed on the walls supporting the ceiling. The code allows a reduction in the fire-resistance-rated separation to a half hour when an NFPA 13 automatic fire sprinkler system is installed throughout the building.

R302.2

The permissible number of townhouses in the building is unlimited, and the code treats their separation somewhat differently. Each townhouse is considered a separate building for separation purposes, with adjoining walls of each unit treated as an exterior wall on a property line.

Each townhouse is separated by a one hour rated construction. Each townhouse one hour wall is structurally independent with a parapet.

The parapet can be eliminated by protecting the roof assembly for four feet. No openings or penetrations are permitted in this area of the roof. Fire retardant treated sheathing for four feet on each side of the wall or one layer of 5/8 inch type X gypsum wallboard is applied to the underside of the roof sheathing.

A design option is to construct a single, common two hour wall but there are some restrictions. When using the two hour common wall option, the wall is not required to be structurally independent. You still have the option of a parapet or a wrap back of protection for four feet. Unprotected openings and penetrations in the wall are prohibited, and electrical boxes must also be protected.

R302

Many tested fire resistance rated assemblies are available utilizing various materials and methods of construction. Assemblies are assigned in hourly fire resistance rating through testing in accordance with the American Society for Testing and Materials Standard ASTME 119, *Test Methods for Fire Tests of Building Materials and Construction* or Underwriters Laboratory UL 263, *Fire Tests of Building Construction and Materials*. Tested assemblies are available in the *Gypsum Association Fire Resistance Design Manual* and from approved testing agencies. Construction must match the design specifications for types of materials, dimensions, and methods of attachment.

Dwelling Separation from Garage

R302.6

Unlike separations between dwelling units, the separation between the residence and a garage is not a fire resistance rated assembly.

Generally the code prescribes 1/2 inch gypsum board installed on the garage side to achieve this separation.

When there are habitable rooms above the garage, the code requires the installation of 5/8 inch type X gypsum board on the garage ceiling. The bearing wall supporting the ceiling framing in this instance also require the application of 1/2 inch gypsum board on the interior surface.

Penetrations through the separation are not required to meet the rated penetration requirements for fire resistance rated assemblies. Openings from the garage into a sleeping room are prohibited. Doors between the dwelling and the garage also provide some resistance to fire, but do not require an assembly with a fire resistance rating. In other words the frame, hardware and sealing of the opening are not addressed, only the materials of the door leaf itself. Any one of the following types of doors satisfies the separation requirement. A 1-3/8 inch thick solid core wood, a 1-3/8 inch thick solid core steel, a 1-3/8 inch honeycombed core steel, a listed door with a 20 minute fire

resistance rating. Whichever type of door is chosen, the code requires it to be equipped with a self-closing device.

Fire Protection of Floors

R501.3

The application of gypsum wallboard or other improved material intends to provide some protection to the floor system against the effects of fire and delay a collapse of the floor primarily as a safeguard for firefighters.

Installation of 1/2 inch gypsum board, 5/8 inch wood structural panel or other approved material is required on the underside of certain floor assemblies of a dwelling unit and accessory buildings constructed under the residential code. This provision applies to lightframe construction consisting of Ijoists, manufactured floor trusses, cold form steel framing and other materials and manufactured products considered most susceptible to collapse in a fire.

Solidsawn lumber and structural composite lumber performed fairly well in retaining adequate strength under fire conditions. Therefore, floors framed with nominal two by ten lumber or a larger of these materials are exempt from this section's fire protection requirements. Similarly, if sprinklers are installed to protect the space between the floor assembly, additional protection is not required. Crawlspaces without storage or fuel-fired appliances are not considered to contain a sufficient fuel load to present an undue hazard to the floor collapse. The code also exempts small areas of ceiling, such as may occur in a utility room in a basement, from the fire protection requirements, provided the space is not open to other portions of the floor system.

Illumination

R303

Though the code retains the traditional standards for natural light from windows, electric lighting satisfies the minimum illumination requirements for habitable rooms in almost all cases. The minimum average illumination level for artificial lighting in habitable rooms is six foot candles, far below typical indoor illumination levels and lighting industry recommendations of 50 foot candles or more. Although windows may be eliminated for lighting purposes, they may still be required for emergency escape and rescue and fresh air ventilation purposes.

R303.7

As part of the egress path and a component presenting increased hazards of fall injuries, stairway design and construction, including adequate illumination is particularly important to safety in a dwelling. The code requires a minimal illumination level of one foot candle at treads and landings of interior stairs. Light sources must be placed in the immediate vicinity of each landing or directly over each flight of stairs. For other than continuous or automatic illumination, such as provided with motion sensors, interior stairways with six or more risers require a wall switch at each floor level.

Exterior stairs require a light source located near the top landing. For other than continuous or automatic illumination, the code requires control by a wall switch located inside the dwelling.

Mechanical Ventilation

R303

To provide fresh air ventilation to habitable rooms, the code requires openings to the outdoors with an area equal to four percent of the floor area of the room or an approved wholehouse mechanical ventilation system. Wholehouse ventilation simply exchanges outdoor air for indoor air at the minimum airflow rates prescribed in the mechanical provisions of the code based on the area of the dwelling and the number of bedrooms. The code does not require a separate system but permits a combination of supply and exhaust fans in achieving adequate ventilation. In addition to habitable rooms, bathroom and toilet rooms require natural or mechanical ventilation. Unless windows provide 1.5 square feet of total openable area for outside air, one or more exhaust fans must be provided to exhaust air directly to the outside.

R315

As part of the safe and healthy interior living environment, the code provides for early warning to alert occupants to hazardous levels of carbon monoxide gas. The code requires carbon monoxide alarms in new dwelling units and when constructing an addition to an existing dwelling. Because carbon monoxide poisoning often occurs when the occupant is sleeping and unaware of developing symptoms, the code requires carbon monoxide alarms to be located in the areas outside of and adjacent to bedrooms.

Building Utilities

Appliance Installation & Location

M1302.1

Listing and labeling of appliances by qualified nationally recognized third party agencies, as mandated by the code, gives assurance that an appliance, when installed according with the manufacturer's instructions, will function satisfactorily for the intended purpose and operate safely. The code requires the appliance to be installed and used in a manner consistent with the listing. For example, the listing may limit the use to a residential application in an indoor location.

The required label is a factory applied nameplate identifying the manufacturer and the testing agency and providing other specified information. Labels for gasfired appliances must indicate the hourly input rating in British thermal units per hour, the approved type of fuel, either natural gas or LP gas, and the minimum clearances around the appliance.

G2406.2

Appliance installation must conform to the requirements of the code and to the conditions of the appliance listing. The appliance listing and manufacturer's installation instructions generally determine minimum clearance to combustibles and minimum air clearance around the appliance for proper operation. In some instances, clearance to combustibles may be reduced with the application of non-combustible insulating materials provided that such is not prohibited by the appliance listing. In general, the code prohibits the installation of gas-fired appliances in bedrooms, bathrooms, toilet rooms or storage closets, or in a space that opens only into such rooms or spaces. Such installation in small rooms with closed doors increases the risk of inadequate combustion air, improper operation, depleted oxygen levels and exposure to carbon monoxide and other hazardous products of combustion if the appliance malfunctions. Directvent appliances have sealed combustion chambers and draw all combustion air directly from the outside. Therefore, direct vent appliances installed according to the manufacturer's instructions are permitted in these spaces.

When all combustion air is taken directly from the outdoors and additional safeguards are in place to isolate the appliance, the code does allow a gas-fired appliance such as a furnace, boiler or water heater to be installed in a room or space that opens only into a bedroom or bathroom. Access to such space must be through a solid weatherstripped self-closing door with no storage or other uses permitted. Certain vented room heaters, fireplaces and decorative appliances may be installed in bedrooms, bathrooms, or connecting spaces when the room contains the prescribed volume of combustion air.

G2408.3

Accidental physical damage to an appliance or its fuel connection also creates a hazardous condition that may result in fire, explosion, or improper appliance operation and the code requires protection from impact by vehicles. Protection may be achieved by installing bollards, curbs, or other approved barriers.

M1502 & G2934

Exhaust systems for electric and gas clothes dryers must be installed in accordance with the appliance listing and the manufacturer's instructions. Dryer exhaust ducts convey moisture and in the case of gas dryers, combustion products to the outdoors. Because dryers discharge combustible lint, the code prescribes measures to prevent lint buildup, thereby reducing the hazard of fire.

Exhaust must go to the outside and terminate a minimum of three feet from building openings. A backdraft damper is required and the installation of screens at the termination point is prohibited. Ducts cannot terminate in attics, soffits, ridge vents or crawl spaces. A permanent label identifying the total length of the concealed ducts is required. The total duct length is limited to a maximum length of 35 feet minus allowances for turns or as specified by the dryer manufacturer. The minimum diameter permitted is four inches. Ducts must be constructed of smooth, rigid metal at least number 28 gauge with joints assembled in the direction of air flow. Connectors between the dryer and the rigid exhaust duct is limited to a single piece of approved listed and labeled transition duct not more than eight feet long and cannot be concealed. Concealed ducts must be protected from fastener penetration.

M1305.1.3

As with other locations, appliances installed in attics require sufficient access opening to remove the largest appliance.

The minimum opening size is 20 inches by 30 inches. Because of the difficulty of accessing and servicing appliances in attics unless they are located adjacent to the access opening, the code places restrictions on the distance to the appliance from the access opening and provides for a solid service passageway not less than 22 inches wide. The length of the passageway is limited to not more than 20 feet unless there is a clear path at least 22 inches wide by six feet high, in which case the appliance may be located as much as 50 feet from the access opening. A solid platform is still required to satisfy the minimum 30 inch by 30 inch working space at the service side of the

appliance. The code further requires a light fixture and receptacle outlet at the appliance location. The light must be controlled by a switch located at the access opening. Similar provisions apply to appliances installed under floors, such as in crawl spaces.

M1507.3

With an increased awareness and emphasis on energy conservation, new house construction increasingly relies on insulation, air barriers, and sealants to provide a tighter thermal envelope, which significantly reduces natural infiltration of outside air. Although the tight construction is beneficial in reducing air leakage and conserving energy, closed house conditions in the heating or cooling season may lead to inadequate fresh air and poor indoor air quality. A whole house mechanical system simply exchanges indoor air for outdoor air and increasingly is necessary to provide adequate fresh air to dwelling units.

Dwelling Unit Floor Area (square feet)	Number of Bedrooms				
	0 – 1	2 – 3	4 – 5	6 – 7	>7
	Airflow in CFM				
<1,500	30	45	60	75	90
1,501 – 3,000	45	60	75	90	105
3,001 – 4,500	60	75	90	105	120
4,501 – 6,000	75	90	105	120	135
6,001 – 7,500	90	105	120	135	150
>7,500	105	120	135	150	165

The code uses a prescriptive design based on floor area and also includes number of bedrooms. This design is dependent on continuous or intermittent operation.

Let's look at this example. A dwelling unit with 2500 square feet and three bedrooms would require a continuous air flow of 60 cubic feet per minute. Supply ventilation can be outdoor air ducts connected to the return side of the air handler. For intermittent systems, the number in the table is multiplied by a factor of one to four.

Fuel Gas Piping & Water Supply Protection

G2414

Approved gas piping materials include schedule 40 steel, approved seamless metallic tubing if the gas used is not corrosive to the material, and corrugated stainless steel tubing or CSST. Approved plastic pipe, tubing and fittings are permitted in exterior underground installations. Fittings and joint compounds when used must be compatible with the piping material and the gas and approved for the specific use.

G2420.5

To facilitate service and replacement, each appliance requires a gas shutoff valve. The valve must be accessible, located upstream of the connector, in the same room as the appliance, and within six feet of the appliance.

G2420.5.3

Fuel gas manifold systems: When installed at a manifold, the code permits shutoff valves located as much as 50 feet from the appliance. The valves must be readily accessible and permanently identified.

P2902.3

The code requirements intend to protect the potable water supply from contamination. Hose connections, boilers, heat exchangers, and lawn irrigation systems require listed backflow prevention devices suitable for the application.

The simplest and most effective means of preventing contamination from drain water and the associated bacteria is through the use of an air gap. Sinks, lavatories, and bathtubs are examples of plumbing fixtures utilizing an air gap, which is the distance between the water outlet and the flood rim level of the fixture. The minimum air gap varies according to the fixture type and application.

P2603.2.1

Concealed piping installed through holes or notches in studs, joists, or rafters and less than 1-1/2 inches from the nearest edge of the framing member requires protection from fastener penetration by shield plates. Protective shield plates must be at least 16 gauge steel and cover the area where the pipe passes through the member. Shield plates must extend at least two inches above bottom plates and below top plates of wall framing.

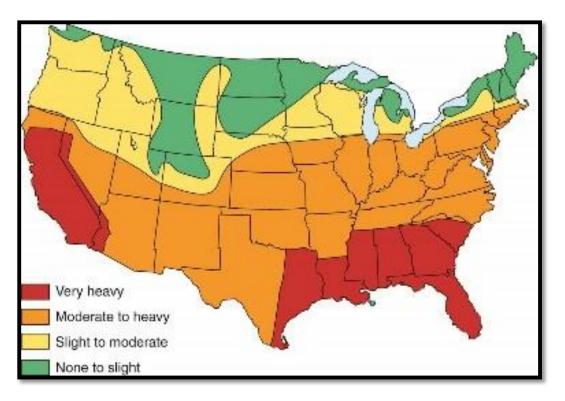
Cast iron and galvanized steel pipe are sufficiently resistant to penetrations by nails or screws and do not require shield plate protection.

Protection from Other Hazards

Termite Control Methods

R318

Subterranean termites cause significant damage to concealed structural and nonstructural wood components. They thrive in moist ground and usually invade homes by building mud tunnels on the surface of foundations. They may also travel inside hollow block masonry, through plastic foam insulation, or directly through untreated wood in contact with the ground or organic materials such as mulch. Mud tunnels may be observed only when the minimum clearance above grade are maintained as required by the code. Termite activity may also be deterred by blocking their access ports above the foundation with termite shields and pressure preservative treated foundation plates.



The termite protection divisions of the code are applicable to all geographical areas subject to termite damage.

Conclusion

Summary & Implications

In this course we explained the fundamental provisions of the 5th Edition Florida Building Code Residential, located general topics and applicable tables in the 5th Edition Florida Building Code Residential, defined terms essential for correct code interpretation and identified the code that relates to the design, construction or inspection of residential buildings.

Resources

<u>References</u>

2012 Building Code Basics: Residential® 5th Edition Florida Building Code, Residential®

Author Biography

John Farinelli, CBO, MCP, CFM, LEED AP

John Farinelli is Vice President of JC Code & Construction Consultants, Inc., a building and fire code consulting firm and continuing education provider in Florida. He has over 30 years' experience in the construction field and in building code administration. He is licensed by the state of Florida under F.S. 468 as a building code administrator, plans examiner and inspector in all disciplines and as a Fire Inspector I under F.S. 633. He is approved by the State of Florida as a continuing education provider and has taught electrical apprenticeship classes, licensing exam preparation classes, building and fire code continuing education seminars. He is a Master Code Professional holding 25 International Code Council (ICC) certifications, is credentialed as a LEED AP by the United States Green Building Council, and is certified as a Floodplain Manager by the Association of State Floodplain Managers. He has provided code consulting services to developers, contractors, architects and engineers and has governmental experience as a building official, plans examiner and inspector. His construction field experience as a journeyman ironworker includes reinforcing steel, post-tension cables, structural steel, welding, pre-stressed and pre-cast concrete erection, glazing systems and miscellaneous metals.