

# ***Advanced Ventilation for Residential applications FBC Res 2010.***

## **Course Description**

**Review of the Residential Ventilation  
requirements in the Florida Building  
Code, Residential 2010.**

# I. Introduction

- *Dean Decker is a Certified Air Conditioning Contractor, Building Official, Mechanical Chief, Mechanical Plans Examiner, and Mechanical Inspector.*
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# Florida Building Code Chapter 1



# FBC 101.2 Scope

- The provisions of this code shall apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures.

# Exceptions:

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1. Detached one- and two-family *dwelling*s and multiple single-family *dwelling*s (*townhouses*) not more than three *stories* above *grade plane* in height with a separate *means of egress* and their accessory structures shall comply with the *Florida Building Code, Residential*. 2. Existing buildings undergoing repair, alterations or additions and change of occupancy shall comply with [Chapter 34 of this code](#).

# 2010 Florida Building Code: Residential

## Chapter 1 - Scope and Administration

- **R101.2 Scope.**

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 *grade plane* in height with a separate means of egress and their *accessory structures*.**

**Exceptions:**

- 1. Live/work units complying with the requirements of Section 438 of the *Florida Building Code, Building* shall be permitted to be built as one- and two-family dwellings or townhouses. Fire suppression required by Section 438.5 of the *Florida Building Code, Building* when constructed under the *Florida Building Code, Residential* shall conform to Section 903.3.1.3 of the *Florida Building Code, Building*.
- 2. Existing buildings undergoing repair, alteration or additions, and change of occupancy shall comply with the *Florida Building Code, Existing Building*.

# FBC 101.3 Intent.

- **R101.2.1**

The provisions of Chapter 1, *Florida Building Code, Building*, shall govern the administration and enforcement of the *Florida Building Code, Residential*.

- The purpose of this code is to establish the *minimum requirements* to safeguard the public health, safety and general welfare through structural strength, means of egress facilities, stability, sanitation, adequate light and ventilation, energy conservation, and safety to life and property from fire and other hazards attributed to the built environment and to provide safety to fire fighters and emergency responders during emergency operations.

# FBC R Chapter 3 - Building and Planning

## SECTION R303 LIGHT, VENTILATION AND HEATING

- **R303.1 Habitable rooms.**

All habitable rooms shall have an aggregate glazing area of not less than 8 percent of the floor area of such rooms. Natural ventilation shall be through windows, doors, louvers or other approved openings to the outdoor air. Such openings shall be provided with ready access or shall otherwise be readily controllable by the building occupants. The minimum openable area to the outdoors shall be 4 percent of the floor area being ventilated.

# Exceptions:

- 1. The glazed areas need not be openable where the opening is not required by Section R310 and an *approved* mechanical *ventilation* system capable of producing 0.35 air change per hour in the room is installed or a whole-house mechanical *ventilation* system is installed capable of supplying outdoor *ventilation* air of 15 cubic feet per minute (cfm) (78 L/s) per occupant computed on the basis of two occupants for the first bedroom and one occupant for each additional bedroom.
  - 2. The glazed areas need not be installed in rooms where Exception 1 above is satisfied and artificial light is provided capable of producing an average illumination of 6 footcandles (65 lux) over the area of the room at a height of 30 inches (762 mm) above the floor level.
  - 3. Use of sunroom *additions* and patio covers, as defined in Section R202, shall be permitted for natural *ventilation* if in excess of 40 percent of the exterior sunroom walls are open, or are enclosed only by insect screening.

## R303.2 Adjoining rooms.

- For the purpose of determining light and *ventilation* requirements, any room shall be considered as a portion of an adjoining room when at least one-half of the area of the common wall is open and unobstructed and provides an opening of not less than one-tenth of the floor area of the interior room but not less than 25 square feet (2.3 m<sup>2</sup>).

**Exception:** Openings required for light and/or *ventilation* shall be permitted to open into a thermally isolated sunroom *addition* or patio cover, provided that there is an openable area between the adjoining room and the sunroom *addition* or patio cover of not less than one-tenth of the floor area of the interior room but not less than 20 square feet (2 m<sup>2</sup>). The minimum openable area to the outdoors shall be based upon the total floor area being ventilated.

## R303.3 Bathrooms.

- Bathrooms, water closet compartments and other similar rooms shall be provided with aggregate glazing area in windows of not less than 3 square feet (0.3 m<sup>2</sup>), one-half of which must be openable.

**Exception:** The glazed areas shall not be required where artificial light and a mechanical *ventilation* system are provided.

The minimum *ventilation* rates shall be 50 cubic feet per minute (24 L/s) for intermittent *ventilation* or 20 cubic feet per minute (10 L/s) for continuous *ventilation*. *Ventilation* air from the space shall be exhausted directly to the outside.

# Natural ventilation provided



# Where do I wash my hands?



# R303.4 Opening location.

- **R303.4 Opening location.**

Outdoor intake and exhaust openings shall be located in accordance with Sections R303.4.1 and R303.4.2.

**R303.4.1 Intake openings.**

Mechanical and gravity outdoor air intake openings shall be located a minimum of 10 feet (3048 mm) from any hazardous or noxious contaminant, such as vents, chimneys, plumbing vents, streets, alleys, parking lots and loading docks, except as otherwise specified in this code. Where a source of contaminant is located within 10 feet (3048 mm) of an intake opening, such opening shall be located a minimum of 2 feet (610 mm) below the contaminant source.

For the purpose of this section, the exhaust from *dwelling* unit toilet rooms, bathrooms and kitchens shall not be considered as hazardous or noxious.

- **R303.4.2 Exhaust openings.**

Exhaust air shall not be directed onto walkways.

You are failing my inspection?! I even  
fire caulked around the duct!!!



## R303.5 Outside opening protection.

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Air exhaust and intake openings that terminate outdoors shall be protected with corrosion-resistant screens, louvers or grilles having a minimum opening size of  $\frac{1}{4}$  inch (6 mm) and a maximum opening size of  $\frac{1}{2}$  inch (13 mm), in any dimension. Openings shall be protected against local weather conditions. Outdoor air exhaust and intake openings shall meet the provisions for *exterior wall* opening protectives in accordance with this code.

# SECTION R309 GARAGES AND CARPORTS

## **R309.1 Floor surface.**

Garage floor surfaces shall be of *approved* noncombustible material.

The area of floor used for parking of automobiles or other vehicles shall be sloped to facilitate the movement of liquids to a drain or toward the main vehicle entry doorway.

## **R309.2 Carports.**

Carports shall be open on at least two sides. Carport floor surfaces shall be of *approved* noncombustible material. Carports not open on at least two sides shall be considered a garage and shall comply with the provisions of this section for garages.

**Exception:** Asphalt surfaces shall be permitted at ground level in carports.

The area of floor used for parking of automobiles or other vehicles shall be sloped to facilitate the movement of liquids to a drain or toward the main vehicle entry doorway.

## **R309.3 Flood hazard areas.**

For buildings located in flood hazard areas as established by Table R301.2(1), garage floors shall be:

1. Elevated to or above the design flood elevation as determined in Section R322; or 2. Located below the design flood elevation provided they are at or above *grade* on at least one side, are used solely for parking, building access or storage, meet the requirements of Section R322 and are otherwise constructed in accordance with this code. **R309.4 Automatic garage door openers.**

Automatic garage door openers, if provided, shall be listed in accordance with UL 325.

( *Note there is no mention of ventilation* )

## M1307.4 Hydrogen generating and refueling operations.

- *Ventilation* shall be required in accordance with Section M1307.4.1, M1307.4.2 or M1307.4.3 in private garages that contain hydrogen-generating *appliances* or refueling systems. For the purpose of this section, rooms or spaces that are not part of the living space of a *dwelling unit* and that communicate directly with a private garage through openings shall be considered to be part of the private garage.

# Hydrogen refueling



- **M1307.4.1 Natural ventilation.**

Indoor locations intended for hydrogen-generating or refueling operations shall be limited to a maximum floor area of 850 square feet (79 m<sup>2</sup>) and shall communicate with the outdoors in accordance with Sections M1307.4.1.1 and M1307.4.1.2. The maximum rated output capacity of hydrogen generating *appliances* shall not exceed 4 standard cubic feet per minute (1.9 L/s) of hydrogen for each 250 square feet (23 m<sup>2</sup>) of floor area in such spaces. The minimum cross-sectional dimension of air openings shall be 3 inches (76 mm). Where ducts are used, they shall be of the same cross-sectional area as the free area of the openings to which they connect. In those locations, *equipment* and *appliance* having an *ignition source* shall be located so that the source of ignition is not within 12 inches (305 mm) of the ceiling.

- **M1307.4.1.1 Two openings.**

Two permanent openings shall be constructed within the garage. The upper opening shall be located entirely within 12 inches (305 mm) of the ceiling of the garage. The lower opening shall be located entirely within 12 inches (305 mm) of the floor of the garage. Both openings shall be constructed in the same exterior wall. The openings shall communicate directly with the outdoors and shall have a minimum free area of  $1/2$  square foot per 1,000 cubic feet ( $1.7 \text{ m}^2/1000 \text{ m}^3$ ) of garage volume.

**M1307.4.1.2 Louvers and grilles.**

In calculating free area required by Section M1307.4.1, the required size of openings shall be based on the net free area of each opening. If the free area through a design of louver or grille is known, it shall be used in calculating the size opening required to provide the free area specified. If the design and free area are not known, it shall be assumed that wood louvers will have a 25-percent free area and metal louvers and grilles will have a 75-percent free area. Louvers and grilles shall be fixed in the open position.

# Did you finish the ducts in that attic?

A man in a white shirt and sunglasses is drinking from a clear plastic cup held to the tailpipe of a blue car. The car's rear window and tailgate are visible. The text 'go for a drink' is overlaid on the left side of the image. Below it, a paragraph of text describes the clean water produced by a fuel cell electric vehicle. At the bottom left, the website 'www.caefcp.org/go' is listed. On the bottom right, there is a logo for 'HYDROGEN MOTION' and a small blue diamond-shaped logo with the word 'Compressed' inside.

**go**  
for a drink

*Nothing like a little exhaust on a hot day.  
Tailpipe emissions from a fuel cell electric  
vehicle...water so clean you can drink it.*

[www.caefcp.org/go](http://www.caefcp.org/go)

HYDROGEN MOTION

Compressed Hydrogen

- **M1307.4.2 Mechanical ventilation.**  
Indoor locations intended for hydrogen-generating or refueling operations shall be ventilated in accordance with Section 502.16 of the *Florida Building Code, Mechanical*. In these locations, *equipment* and *appliances* having an *ignition source* shall be located so that the source of ignition is below the mechanical *ventilation* outlet(s).
- **M1307.4.3 Specially engineered installations.**  
As an alternative to the provisions of Sections M1307.4.1 and M1307.4.2, the necessary supply of air for *ventilation* and dilution of flammable gases shall be provided by an *approved* engineered system.

# BORA Inspectors Vehicle



# Chapter 15 - Exhaust Systems

- **M1501.1 Outdoor discharge.**

The air removed by every mechanical exhaust system shall be discharged to the outdoors. Air shall not be exhausted into an *attic*, soffit, ridge vent or crawl space.

**Exception:** Whole-house *ventilation*-type *attic* fans that discharge into the *attic* space of *dwelling units* having private *attics* shall be permitted.

# SECTION M1502 CLOTHES DRYER EXHAUST

- **M1502.4.5 Length identification.**

Where the exhaust duct is concealed within the building construction, the equivalent length of the exhaust duct shall be identified on a permanent label or tag. The label or tag shall be located within 6 feet (1829 mm) of the exhaust duct connection. **M1502.4.6 Exhaust duct required.**

Where space for a clothes dryer is provided, an exhaust *duct system* shall be installed. Where the clothes dryer is not installed at the time of occupancy the exhaust duct shall be capped or plugged in the space in which it originates and identified and marked "future use."

**Exception:** Where a *listed* condensing clothes dryer is installed prior to occupancy of the structure. **M1502.5 Protection required.**

Protective shield plates shall be placed where nails or screws from finish or other work are likely to penetrate the clothes dryer exhaust duct. Shield plates shall be placed on the finished face of all framing members where there is less than  $1\frac{1}{4}$  inches (32 mm) between the duct and the finished face of the framing member. Protective shield plates shall be constructed of steel, shall have a minimum thickness of 0.062-inch (1.6 mm) and shall extend a minimum of 2 inches (51 mm) above sole plates and below top plates.



## FOR PEAK PERFORMANCE YOUR DRYER NEEDS A GOOD EXHAUST SYSTEM

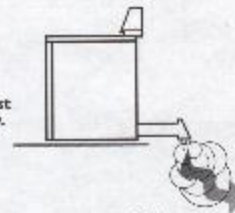


**Warning —**  
Plastic or nonmetal flexible duct presents a potential fire hazard.

**DO** Read the installation instructions and the user's guide.

**DON'T** Let a poor exhaust system cause slow drying.

**DO** Let your dryer exhaust the air easily.



**DON'T** Restrict your dryer with a poor exhaust system.



**DO**

Use 4 inch diameter rigid metal duct. Tape all joints. Never use lint-trapping screws.

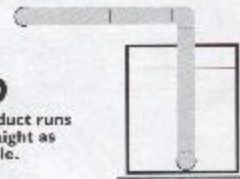


**DON'T** Use plastic, thin foil, or non-metal flexible duct.



**DO**

Keep duct runs as straight as possible.

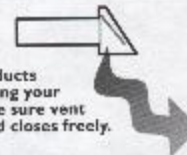


**DON'T** Use longer than necessary duct runs with many elbows.



**DO**

Clean all old ducts before installing your new dryer. Be sure vent flap opens and closes freely.



**DON'T**

Allow crushed or clogged ducts and vent.



- **SECTION M1503 RANGE HOODS**

- M1503.1 General.**

- Range hoods shall discharge to the outdoors through a single-wall duct. The duct serving the hood shall have a smooth interior surface, shall be air tight and shall be equipped with a backdraft damper. Ducts serving range hoods shall not terminate in an *attic* or crawl space or areas inside the building.

- Exception:** Where installed in accordance with the manufacturer's installation instructions, and where mechanical or natural *ventilation* is otherwise provided, *listed* and *labeled* ductless range hoods shall not be required to discharge to the outdoors.

- **M1503.2 Duct material.**

# SECTION M1504 INSTALLATION OF MICROWAVE OVENS

- **M1504.1 Installation of a microwave oven over a cooking appliance.**

The installation of a *listed* and *labeled* cooking appliance or microwave oven over a *listed* and *labeled* cooking appliance shall conform to the terms of the upper appliance's *listing* and *label* and the manufacturer's installation instructions. The microwave oven shall conform to UL 923.

# SECTION M1505 OVERHEAD EXHAUST HOODS

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## **M1505.1 General.**

Domestic open-top broiler units shall have a metal exhaust hood, having a minimum thickness of 0.0157-inch (0.3950 mm) (No. 28 gage) with  $\frac{1}{4}$  inch (6.4 mm) clearance between the hood and the underside of combustible material or cabinets. A clearance of at least 24 inches (610 mm) shall be maintained between the cooking surface and the combustible material or cabinet. The hood shall be at least as wide as the broiler unit, extend over the entire unit, discharge to the outdoors and be equipped with a backdraft damper or other means to control infiltration/exfiltration when not in operation. Broiler units incorporating an integral exhaust system, and *listed* and *labeled* for use without an exhaust hood, need not have an exhaust hood.

# SECTION M1506 EXHAUST DUCTS

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## **M1506.1 Ducts.**

Where exhaust duct construction is not specified in this chapter, construction shall comply with [Chapter 16](#).

# SECTION M1507 MECHANICAL VENTILATION

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## **M1507.1 General.**

Where toilet rooms and bathrooms are mechanically ventilated, the *ventilation equipment* shall be installed in accordance with this section.

## **M1507.2 Recirculation of air.**

Exhaust air from bathrooms and toilet rooms shall not be recirculated within a residence or to another *dwelling unit* and shall be exhausted directly to the outdoors. Exhaust air from bathrooms and toilet rooms shall not discharge into an *attic*, crawl space or other areas inside the building.

## **M1507.3 Ventilation rate.**

*Ventilation* systems shall be designed to have the capacity to exhaust the minimum air flow rate determined in accordance with Table M1507.3.

# TABLE M1507.3 MINIMUM REQUIRED EXHAUST RATES FOR ONE- AND TWO-FAMILY DWELLINGS

| AREA TO BE VENTILATED  | VENTILATION RATES                                                             |
|------------------------|-------------------------------------------------------------------------------|
| Kitchens               | 100 cfm intermittent or<br>25 cfm continuous                                  |
| Bathrooms—Toilet Rooms | Mechanical exhaust capacity of<br>50 cfm intermittent or 20 cfm<br>continuous |

Ok, we'll have to start from the beginning



- Questions and comments.
- Course #
- Instructor: D. Decker, R. Soto