Florida Building Code 2010 Advanced Training: Indoor Environmental Quality

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FL Course # 9877867 .2 CEUs

FL Provider # 2040

Fl Building Code, Building: Chapter 12 Interior Environment (1201 General)

1201.1 SCOPE

- **Ventilation** – (1203) Indoor Air Quality (IAQ)
- **Temp. Control** (1204) Thermal Comfort (IEQ)
- **Lighting**- (1205) Visual Comfort: (IEQ)
- **Yards and Courts** (1206) In relation to interiors
- **Sound Transmission** (1207) Sound Control (IEQ)
- **Interior Space Dimensions** (1208) Spatial Comfort (IEQ)
- **Access to Unoccupied** (1209) **Spaces**
- **Surrounding Materials** (1210) Finishes (IAQ) Biological contaminants (IAQ)&(IEQ) Pertaining to interiors

Ventilation: Indoor Air Quality & Indoor Environmental Quality

- High Performance HVAC / IAQ Sensors
- HEPA Filtration
- Dehumidification systems
- Ventilation
- Construct Tight Buildings
- Barrier safe foundation (Sealing under slab)
- VOC-free Interior Finishes & Furnishings

Indoor Air Quality (IAQ) Statistics

- People spend 90% time indoors
- Indoor pollutant levels 2 to 5 x greater than outdoors
- Infants and elderly most vulnerable
- 14 million asthma school days missed per year*

**According to the American Lung Association*

Ventilation

- General

  Buildings shall be provided with natural ventilation in accordance with Section 1203.4, or mechanical ventilation in accordance with the *Florida Building Code.*

FBC Section 1203.1

Ventilation- Attic Spaces

- Enclosed attics and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof framing members shall have cross ventilation for each separate space by ventilating openings protected against the entrance of rain and snow.
- Blocking and bridging shall be arranged so as not to interfere with the movement of air.

FBC Section 1203.2

continued >

Ventilation- Attic Spaces cont.

- A minimum of 1 inch (25mm) of air space shall be provided between the insulation and the roof sheathing. The net free ventilating area shall not be less than 1/300 of the area of the space ventilated, with 50% of the required ventilating area provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet (914 mm) above eave or cornice vents with the balance of the required ventilation provided by eave or cornice vents.

FBC Section 1203.2

continued >

Ventilation Attic Spaces: Exceptions

1. Attic Spaces, designed by a Florida-licensed engineer or registered architect to eliminate the attic venting.

FBC Section 1203.2

Newer Studies

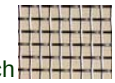
- Newer ASHRAE studies have found that the practice of attic ventilation to be detrimental to structures in warm humid climates.
- ASHRAE detailed practices for 3 climatic conditions:
  1. Cold
  2. Mixed
  3. Warm Humid
- New FBC codes allow construction practices which do not require attic to be ventilated.

Openings Into Attics

- Exterior openings into the attic space of any building intended for human occupancy shall be protected to prevent the entry of birds, squirrels, rodents, snakes and other similar creatures. Openings for ventilation having a least dimension of 1/16 inch (1.6 mm) minimum and 1/4 inch (6.4 mm) maximum shall be permitted.

FBC Section 1203.2.1

¼ inch 

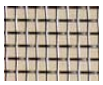
1/16 inch 

Openings Into Attics

- Openings for ventilation having a least dimension larger than 1/4 inch (6.4 mm) shall be provided with corrosion- resistant wire cloth screening, hardware cloth, perforated vinyl or similar material with openings having a least dimension of 1/16 inch (1.6 mm) minimum and 1/4 inch (6.4 mm) maximum. Where combustion air is obtained from an attic area, it shall be in accordance with Chapter 7 of the Florida Building Code, Mechanical

FBC Section 1203.2.1

¼ inch 

1/16 inch 

Under Floor Ventilation

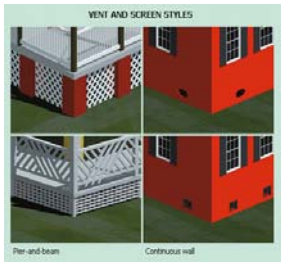
- The space between the bottom of the floor joists and the earth under any building except spaces occupied by a basement or cellar shall be provided with ventilation openings through foundation walls or exterior walls. Such openings shall be placed so as provide cross ventilation of under-floor space.

FBC Section 1203.3

Vent openings in a stem wall foundation provide cross ventilation

Openings for Under Floor Ventilation

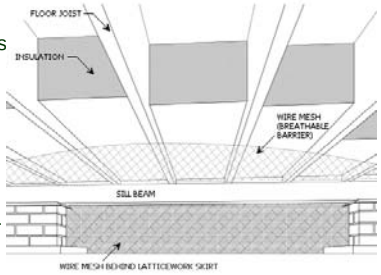
- The minimum net area of ventilation openings shall not be less than 1 sf for each 150 sf (0.67 m² for each 100 m²) of crawl space area. Ventilation openings shall be covered for their height and width with any of the following materials, provided that the least dimension of the covering shall not exceed ¼ inch (6mm):



FBC Section 1203.3.1

Permissible Materials

1. Perforated sheet metal plates not less than 0.070 inch (1.8 mm) thick.
2. Expanded sheet metal plates not less than 0.047 inch (1.2mm) thick.
3. Cast iron grilles or gratings.
4. Extruded load-bearing vents.
5. Hardware cloth of 0.035 inch (0.89 mm) wire or heavier
6. Corrosion-resistant wire mesh, with the least dimension not exceeding 1/8 inch (3.2 mm).



Exceptions to 1203.3 & 1203.3.1

1. **Where warranted by climatic conditions, ventilation openings to outdoors not required if ventilation openings to the interior are provided.**
2. **The total area of ventilation openings is permitted to be reduced 1/1,500 of the under floor area where the ground surface is covered with a Class I vapor retarder material and the required openings are placed so as to provide cross ventilation of the space. Installation of operable louvers shall not be prohibited.**

FBC Section 1203.3.2

Exceptions continued

3. Ventilation openings are not required where continuously operated mechanical ventilation is provided at a rate of 1.0 **cubic foot per minute (cfm)** for each 50 sf (1.02 L/s for each 10 m²) of crawl-space floor area and the ground surface is covered with a Class I vapor retarder.

FBC Section 1203.3.2 continued >

Exceptions continued

4. Ventilation openings are not required when the ground surface is covered with a Class I vapor retarder, the perimeter walls are insulated and the space is conditioned in accordance with Chapter 13 of *Florida Building Code, Energy Conservation.*
5. *For buildings in flood hazard areas as established in Section 1612.3, the openings for under-floor ventilation shall be deemed as meeting the flood opening requirements of ASCE 24 provided that the ventilation openings are designed and installed in accordance with ASCE 24.*
6. Crawl spaces, designed by a Florida licensed engineer or registered architect to eliminate the venting.

FBC Section 1203.3.2

Natural Ventilation

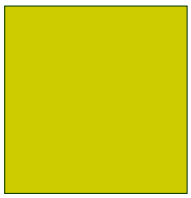
- Natural ventilation of an occupied space shall be through windows, doors, louvers or other openings to the outdoors. The operating mechanism for such openings shall be provided with ready access so that the openings are readily controllable by the building occupants.

FBC Section 1203.4

Ventilation Area Required

- The minimum openable area to the outdoors shall be 4% of the floor area being ventilated.

20 x 20 floor area



- What is minimum openable area?

FBC Section 1203.4.1

Adjoining Spaces

- Where rooms and spaces without openings to outdoors are ventilated through adjoining room, opening to adjoining room shall be unobstructed and shall have an area of no less than 8 % of the floor area of the interior room or space, but not less than 25 square feet (2.3 m2). The minimum openable area to the outdoors shall be based on the total floor area being ventilated.

FBC Section 1203.4.1.1

continued >

Adjoining Spaces: Exception

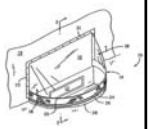
- Exterior openings required for ventilation shall be permitted to open into a thermally isolated sunroom addition or patio cover provided that the openable area between the sunroom addition or patio cover and the interior room shall have an area of not less than 8 % of the floor area of the interior or space, but not less than 20 square feet (1.86 m²).

The minimum openable area to the outdoors shall be based on the total floor area being ventilated.

FBC Section 1203.4.1.1

Openings Below Grade

- When openings below grade provide required natural ventilation, the outside horizontal clear space measured perpendicular to the opening shall be one and one-half times the depth of the opening. The depth of the opening shall be measured from the average adjoining ground level to the bottom of the opening.



- **FBC Section 1203. 4.1.2**

Contaminants Exhausted

- Contaminant sources in naturally ventilated spaces shall be removed in accordance with the *Florida Building Code, Mechanical* and the *Florida Fire Prevention Code.*

FBC Section 1203.4.2

The 2007 Florida Fire Prevention Code (print version) is now available from:
BNI Publications
1612 S. Clementine Street
Anaheim, CA 92802
1.888.264.2665
www.bnibooks.com

2007 Florida Fire Prevention Code

- **Florida Fire Prevention Code is adopted by the State Fire Marshal at three year intervals as required by Chapter 633.0215, Florida Statutes. This complex set of fire code provisions are enforced by the local fire official within each county, municipality, and special fire district in the state. The county, municipality or special district in which you reside may also have local amendments applicable only to your community.**
- **If you have a specific question regarding the Florida Fire Prevention Code or how it affects a specific building, occupancy or place of residence, please contact your local fire official. You may access the Florida Fire Prevention Code by going to: http://www.myfloridacfo.com/sfm/florida_fire_prevention_code_2010.htm**
- **Check with your community on any "Local Amendments" that may apply.**
- **Local amendments are enforceable only by the local jurisdiction and may not be appealed to the State Fire Marshal.**

Bathrooms: Exhausting Air & Moisture

Exclusive Ducting to Outside

Bathroom shower exhaust ***Rooms containing bathtubs, showers, spas and similar bathing fixtures shall be mechanically ventilated in accordance with the Florida Building Code, Mechanical***

FBC Section 1203.4.2.1

However, Section R303.3 reads In lieu of mechanical ventilation, the aggregate glass area in bathroom windows shall be three sq. ft. with one-half of the glass area required to be openable.

Openings on Yards or Courts

- Where natural ventilation is to be provided by openings onto yards or courts, such yards or courts shall comply with Section 1206.

FBC Section 1203.4.3

Other Ventilation & Exhaust Systems

- Ventilation and exhaust systems for occupancies and operations involving flammable or combustible hazards or other contaminant sources as covered in the *Florida Building Code, Mechanical* or the *Florida Fire Prevention Code* shall be provided as required by both codes.

FBC Section 1203.5

Ventilation: Indoor Air Quality

- ***In order to reduce contamination from concentrated sources and to reduce humidity either natural or mechanical ventilation must be supplied.***

FBC Energy 503.2.5

Demand Control Ventilation

Demand control ventilation is required for spaces larger than 500 ft2 and with an average occupant load of 40 people per 1000 ft2 (93 m2) of floor area served by systems with one or more of the following:

1. An air-side economizer;
2. Automatic modulating control of the outdoor air damper; or
3. A design outdoor airflow greater than 3,000 cfm (1400 L/s).

FBC Energy 503.2.5.1

Exceptions

1. Systems with energy recovery complying with Section 503.2.6.
2. Multiple-zone systems without direct digital control of individual zones communicating with a central control panel.
3. System with a design outdoor airflow less than 1,200 cfm.
4. Spaces where the supply airflow rate minus any makeup or outgoing transfer air requirement is less than 1,200 cfm.

FBC Energy 503.2.5.1

Dehumidification

- Where humidistatic controls are provided, they must prevent reheating, the mixing of hot and cold airstreams, or other means of simultaneous heating and cooling of the same airstream

FBC Energy 503.4.5.5

Exceptions:

1.The system is capable of reducing supply air volume to 50 percent or less of the design airflow rate or the minimum rate specified in Section 6.1.3 of ASHRAE Standard 62, whichever is larger, before simultaneous heating and cooling takes place.

2. The individual fan cooling unit has a design cooling capacity of 80,000 Btu/h or less and is capable of unloading to 50 percent capacity before simultaneous heating and cooling takes place

3. The individual mechanical cooling unit has a design cooling capacity of 40,000 Btu/h or less. An individual mechanical cooling unit is a single system composed of a fan or fans and a cooling coil capable of providing mechanical cooling.

FBC Energy 503.4.5.5

Exceptions:

4. Systems serving spaces where specific humidity levels are required to satisfy process needs, such as computer rooms, museums, surgical suites, and buildings with refrigerating systems, such as supermarkets, refrigerated warehouses, and ice arenas. This exception also applies to other applications for which fan volume controls in accordance with Exception 1 are proven to be impractical to the enforcement agency.

5. At least 75 percent of the energy for reheating or for providing warm air in mixing systems is provided from a site-recovered (including condenser heat) or site solar energy source.

6. Systems where the heat added to the airstream is the return air enthalpy result of the use of a desiccant system and 75 percent of the heat added by the desiccant system is removed by a heat exchanger, either before or after the desiccant system with energy recovery.

FBC Energy 503.4.5.5

Temperature Control Equipment & Systems

- Interior spaces intended for human occupancy are to be provided with active or passive space-heating systems:
  - **capable of maintaining a minimum indoor temperature of 68°F (20°C)**
  - **At a point 36” above finished floor**
    - **Exception: interior spaces where the primary purpose is not associated with human comfort**

FBC Section 1204.1

Calculation of Loads

- Design loads are determined in accordance with the procedures described in the ASHRAE/ACCA Standard 183 or ACCA Manual N.
- The Design Loads are attached to the code compliance form submitted to the building department for permit or, in the event the mechanical permit is obtained at a later time, the sizing calculation is submitted with the application for the mechanical permit.

FBC Energy 503.2

Calculation of Loads Cont.

- Heating and cooling loads have to be adjusted to account for load reductions that are achieved when energy recovery systems are utilized in the HVAC system in accordance with the ASHRAE *HVAC Systems and Equipment Handbook*. Alternatively, design loads can be determined by an *approved* equivalent computation procedure, using the design parameters specified in Chapter 3 of the Florida Building Code- Energy.

FBC Energy 503.2

Exceptions

Where mechanical systems are designed by an engineer registered in the State of Florida, the engineer has the option of submitting a signed and sealed summary sheet to the building department in lieu of the complete sizing calculation(s).

FBC Energy 503.2

Exceptions

Such summary sheet shall include the following (by zone):

Project name/owner
Project address
Sizing method used
Total latent gain
Total sensible gain
Total cooling required with outside air
Total heating required with outside air
Outdoor dry bulb used
Indoor dry bulb
Outdoor wet bulb used
Relative humidity
Area in sq.ft.
Grains water (difference)

FBC Energy 503.2

Equipment/System Sizing

Equipment and systems capacity cannot exceed the calculated loads A single piece of equipment providing both heating and cooling must satisfy this provision for one function with the capacity for the other function as small as possible, within available equipment options.

FBC Energy 503.2.2

Sizing Exceptions

1. Required standby equipment and systems provided with controls and devices that allow such systems or equipment to operate automatically only when the primary equipment is not operating.
2. Multiple units of the same equipment type with combined capacities exceeding the design load and provided with controls that have the capability to sequence the operation of each unit based on load.
3. When the equipment selected is the smallest size needed to meet the load within available options of the desired equipment line.

FBC Energy 503.2.2

HVAC Performance

- HVAC installed equipment has to meet the minimum equipment efficiency requirements of the code.
- The efficiency is to be verified through certification under an *approved* certification program or, if no certification program exists, the equipment efficiency ratings must be supported by data furnished by the manufacturer.
- Where multiple rating conditions or performance requirements are provided, the equipment has to satisfy all of the stated requirements.
- Where components, such as indoor or outdoor coils, from different manufacturers are used, calculations and supporting data has to be furnished by the designer that demonstrates that the combined efficiency of the specified components meets the specified requirements.

FBC Energy 503.2.3

Equipment Sized or Controlled

- Buildings which contain assembly occupancies must have equipment sized or controlled to prevent continuous space cooling or heating of the spaces with peak capacity equipment by the following options:
  1. Equipment is staged to include cooling or heating to the space and stages are controlled by an electronically controlled energy management system.

FBC Energy 503.2.2.1 **continued>**

Continued:

2. A separate cooling or heating system is utilized to provide cooling or heating to the assembly occupancy.
3. A variable speed compressor is utilized to provide cooling or heating to the assembly occupancy.

FBC Energy 503.2.2.1

Complex Systems

- Supply air systems serving multiple zones must be VAV systems which, during periods of occupancy, are designed and capable of being controlled to reduce primary air supply to each *zone* to one of the following before reheating, recooling or mixing takes place:
  1. Thirty percent of the maximum supply air to each *zone*.
  2. Three hundred cfm (142 L/s) or less where the maximum flow rate is less than 10 percent of the total fan system supply airflow rate.
  3. The minimum ventilation requirements of Chapter 4 of the *Florida Building Code, Mechanical*.

FBC Energy 503.4.5

Exceptions

- **Exception:** The following define when individual zones or when entire air distribution systems are exempted from the requirement for VAV control:
  1. Zones where special pressurization relationships or cross-contamination requirements are such that VAV systems are impractical.
  2. Zones or supply air systems where at least 75 percent of the energy for reheating or for providing warm air in mixing systems is provided from a site-recovered or site-solar energy source.
  3. Zones where special humidity levels are required to satisfy process needs.
  4. Zones with a peak supply air quantity of 300 cfm or less and where the flow rate is less than 10 percent of the total fan system supply airflow rate.

FBC Energy 503.4.5 **Continued>**

Exceptions Cont.

5. Zones where the volume of air to be reheated, recooled or mixed is no greater than the volume of outside air required to meet the minimum ventilation requirements of Chapter 4 of the *Florida Building Code, Mechanical*.

6. Zones or supply air systems with thermostatic and humidistatic controls capable of operating in sequence the supply of heating and cooling energy to the zone(s) and which are capable of preventing reheating, recooling, mixing or simultaneous supply of air that has been previously cooled, either mechanically or through the use of economizer systems, and air that has been previously mechanically heated.

7. Systems that are designed and dedicated to condition only the outdoor ventilation air stream to meet the requirements of ASHRAE Standard 62. Such systems shall be controlled so that they do not allow overcooling of the building. Any building utilizing this exception that has a system that requires reheat, other than reclaimed waste heat, shall comply by Section 506 of this code

FBC Energy 503.4.5 **Continued>**

Air Handing Units in Attic

- Air-handling units are allowed in attics for compliance by Section 405 only if the following conditions are met:

1. The service panel of the equipment is located within 6 feet (1829 mm) of an attic access.

FBC Energy 403.2.4

403.2.4 continued

2. A device is installed to alert the owner or shut the unit down when the condensation drain is not working properly.
3. The attic access opening is of sufficient size to replace the air handler.
4. A notice is posted on the electric service panel indicating to the homeowner that the air handler is located in the attic. Said notice shall be in all capitals, in 16 point type, with the title and first paragraph in bold:

FBC Energy 403.2.4

NOTICE TO HOMEOWNER

A PART OF YOUR AIR-CONDITIONING SYSTEM, THE AIR HANDLER, IS LOCATED IN THE ATTIC. FOR PROPER, EFFICIENT, AND ECOMOMIC OPERATION OF THE AIR-CONDITIONING SYSTEM, YOU MUST ENSURE THAT REGULAR MAINTENANCE IS PERFORMED.

YOUR AIR-CONDITIONING SYSTEM IS EQUIPPED WITH ONE OR BOTH OF THE FOLLOWING: (1) A DEVICE THAT WILL ALERT YOU WHEN THE CONDENSATION DRAIN IS NOT WORKING PROPERLY OR (2) A DEVICE THAT WILL SHUT THE SYSTEM DOWN WHEN THE CONDENSATION DRAIN IS NOT WORKING. TO LIMIT POTENTIAL DAMAGE TO YOUR HOME, AND TO AVOID DISRUPTION OF SERVICE, IT IS RECOMMENDED THAT YOU ENSURE PROPER WORKING ORDER OF THESE DEVICES BEFORE EACH SEASON OF PEAK OPERATION.

"Flush Out" According to LEED

- To help ensure the indoor air quality, mechanical systems are operated for a minimum amount of time using 100% outside air at the end of construction and prior to building occupancy
  - *14,000 cubic feet of outdoor air
  - *Maintain indoor temperature of at least 60*F
  - *Maintain indoor RH no higher than 60%
  - *Schedule to reduce occupant exposure

LEED-CI 2.0

Thermal Comfort

- ***"That condition of mind which expresses satisfaction with the thermal environment"***
  (ASHRAE 55-2004)*

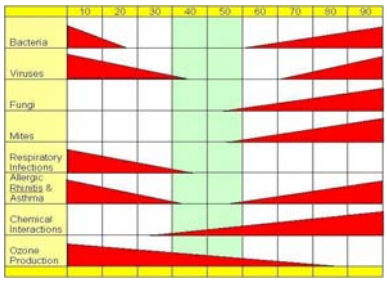
Thermal Environmental Conditions for Human Occupancy, provides a simple method of compliance for commonly-designed space types, a calculation method that applies to a broader range of space types, and a new adaptive method for naturally ventilated spaces in certain climate areas.

***ANSI / ASHRAE Standard is not mandatory**

Thermal Comfort - Relative Humidity

- ASHRAE 55-2004 recommends that indoor relative humidity not exceed 60%
- Indoor relative humidity under 30% is termed as "*dead air".*
- Maintaining an indoor relative humidity above 40% minimizes the potential for:
  - Increased static electricity
  - Health problems (more infections w/ lower RH)
    - Skin irritation
    - Dry nasal passages

Optimal RH



Excessive Moisture in Homes

- Shrubbery too near building
- Opening windows at night
- Oversized A/C & heat pump units
- Cooling-unacceptable SHR rating
- Wet crawlspaces & Wall Cavities
- Unvented heating systems
- Sprinkler systems
- Leaky roofs & duct work
- Improperly installed windows
- Poor mechanical systems
- Air Circulation & Exhaust fans
- Power roof ventilators
- Cool building surfaces

Lighting

Lighting Principles
Light Sources
Light Levels
Daylighting

Principles of Lighting Design

- Goal of lighting design is to create efficient, functional, aesthetically pleasing interiors.
- Design with effective, energy-efficient, low-maintenance, thermally controlled fixtures.
- Reflective surfaces and finishes on ceilings, walls, floors and furnishings make better use of quantity of light.

Daylighting and Views

- Provides connection between indoor spaces and outdoor environments through introduction of sunlight and views into occupied areas of bldg.
- Light levels are code stipulated mandatory minimum levels of illumination.

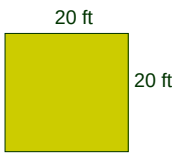
Lighting - General

- Every space intended for human occupancy shall be provided with natural light by means of exterior glazed openings in accordance with Section 1205.2 or shall be provided with artificial light in accordance with Section 1205.3
- Exterior glazed openings shall open directly onto a public way or onto a yard or court in accordance with Section 1206.

FBC Section 1205.1

Daylighting: FL Code

- Natural Light
  - The minimum net glazed area shall not be less than 8 % of the floor area of the room served.



What is the minimum square feet of glazing necessary?

FBC Section 1205.2

Daylighting: FL Code

- Adjoining spaces – For the purpose of natural lighting, any room is considered as a portion of an adjoining room where ½ of the area of the common wall is:
  - Open and unobstructed
  - Provides an opening of not less than 1/10 of the floor area of the interior room or 25 SF whichever is greater.

FBC Section 1205.2.1

Exception:

- Openings required for natural light shall be permitted to open into a thermally isolated sunroom addition or patio cover where the common wall provides a glazed area of not less than one-tenth of the floor area of the interior room or 20 square feet, whichever is greater.

FBC Section 1205.2.1

Exterior Openings

- Exterior openings required by Section 1205.2 for natural light shall open directly onto a public way, yard or court, as set forth in Section 1206.

FBC Section 1205.2.2

continued >

Exterior Openings: Exceptions

1. Required exterior openings are permitted to open into a roofed porch where the porch:
   - 1.1 Abuts a public way
   - 1.2 Has a ceiling height of not less than 7 feet, and
   - 1.3 Longer side 65% open & unobstructed.
2. Skylights are not required to open directly onto a public way, yard or court.

FBC Section 1205.2.2

Artificial Light: FL Code

- Artificial light shall be provided that is adequate to provide an average illumination of 10 foot-candles (107 lux) over the area of the room at a height of 30 inches (762 mm) above the floor level.
- **FBC Section 1205.3**

Light Levels

- Good lighting requires both right quantity and quality of light to perform a particular task
- Considerations include:
  - Nature of task
  - Age of person performing task
  - Reflectance of room
  - Speed and Accuracy for task performance

Elderly need three to five times more light than an average 30 year old and five to seven times more light than children.

Light Sources:

- Incandescent
  Phase out 2012-2014/ Heat Source
- Tungsten Halogen

- High-Intensity Discharge (HID)

- Fluorescent (CFLs)
  lasts 10 – 13 x longer; ¼ energy use

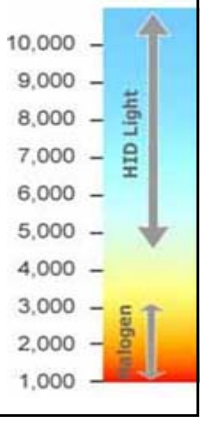
- Light Emitting Diodes (LED)

Light Emitting Diodes

- A LED is a semiconductor diode that emits light when an electric current is applied in the forward direction of the device, as in the simple LED circuit.
- The effect is a sort of electroluminescence.
- Non-heat producing and highly energy efficient
- Save 90% energy, last up to 60,000 hours, are cool to the touch, unbreakable and save time & money

Color Correlated Temperatures:

3000K…..warm…..orange/yellow/red
4000 K…..cool…….blue
5000 K…..daylight



Stairway Illumination

- Stairways within dwelling units and exterior stairways serving a dwelling unit shall have an illumination of 10 foot-candles (11 lux).
- Stairs in other occupancies shall be governed by Chapter 10. **FBC Section 1205.4**
- **Controls** - The control of activation of the required stairway lighting shall be in accordance with Chapter 27 of the *Florida Building Code, Building.*

FBC Section 1205.4.1

Emergency Egress Lighting

- The means of egress shall be illuminated in accordance with Section 1006.1

FBC Section 1205.5

Exit Signs:

- Directional exit signs are required at corridor intersections or directional changes
- Directional exit signs are required in: Theatres, Educational Facilities, Hotels, Hospitals, Hazard Locations

Sound Transmission

Scope
Airborne Sound
Structure

Sound Transmission - Scope

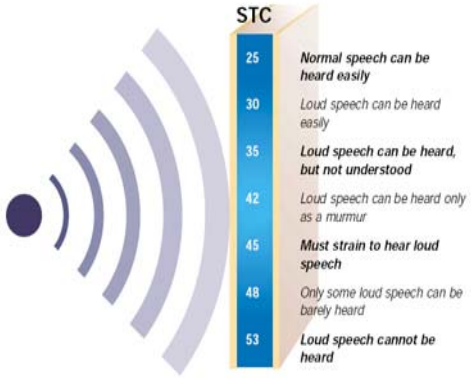
- This section shall apply to common interior walls, partitions and floor/ceiling assemblies between adjacent dwelling units or between dwelling units and adjacent public areas such as halls, corridors, stairs or service areas.

FBC Section 1207.1

Airborne Sound

- Walls, partitions and floor/ceiling assemblies separating dwelling units from each other or from public or service areas shall have a **sound transmission class** (**STC**) of not less than 50 (45 if field tested) for airborne noise when tested in accordance with ASTM E 90.

FBC Section 1207.2



Airborne Sound (continued)

- Penetrations or openings in construction assemblies for piping; electrical devices; recessed cabinets; bathtubs; soffits or heating, ventilating or exhaust ducts shall be sealed, lined, insulated or otherwise treated to maintain the required ratings.

  This requirement shall not apply to dwelling unit entrance doors; however such doors shall be tight fitting to the frame and sill.

FBC Section 1207.2

Airborne Sound (continued)

- Masonry. The sound transmission class of concrete masonry and clay masonry assemblies shall be calculated in accordance with TMS 0302 or determined through testing in accordance with ASTM E 90.

FBC Section 1207.2.1

Structure-borne Sound

- Floor/ceiling assemblies between dwellings or between a dwelling unit and a public or service area within the structure shall have an **impact insulation class** (**IIC**) rating of not less than 50 (45 if field tested) when tested in accordance with ASTM E 492.

FBC Section 1207.3

Interior Space Dimensions

Spatial Comfort
Furred Ceiling
Room Area
Efficiency Dwelling Units

Spatial Comfort

- Minimum room widths: Habitable spaces, other than a kitchen, shall not be less than 7 feet in any plan dimension.
- Kitchens shall have a clear passageway of not less than 3 feet between counter fronts and appliances or counter fronts and walls.

FBC Section 1208.1

Spatial Comfort

- Minimum Ceiling Heights. Occupiable spaces, habitable spaces and corridors shall have a ceiling height of not less than 7 feet 6 inches (2286 mm).
- Bathrooms, toilet rooms, kitchens, storage rooms and laundry rooms shall be permitted to have a ceiling height of not less than 7 feet (2134mm).

FBC Section 1208.2

Spatial Comfort - Exceptions

- Exceptions:

1. in one-and two-family dwellings, beams or girders spaced not less than 4 feet (1219 mm) on center and projecting not more than 6 inches (152 mm) below the required ceiling height.

FBC Section 1208.2

Spatial Comfort - Exceptions

2. If any room in a building has a sloped ceiling, the prescribed ceiling height for the room is required in one-half the area thereof. Any portion of the room measuring less than 5 feet (1524 mm) from the finished floor to the ceiling shall not be included in any computation of the minimum area thereof. For accessibility provisions related to vertical clearance of areas adjoining an accessible route, refer to Section 307.4 of the Florida Accessibility Code.
3. Mezzanines constructed in accordance with Section 505.1

FBC Section 1208.2

Furred Ceiling

- Any room with a furred ceiling shall be required to have the minimum ceiling height in two-thirds of the area thereof, but in no case shall the height of the furred ceiling be no less than 7 feet (2134 mm).

FBC Section 1208.2.1

Room Area

- Every dwelling should have at least one room that shall have not less than 120 sf (13.9 m_2) of net floor area. Other habitable rooms shall have a net floor area of not less than 70 sf (6.5m_2)
- Exception: Every kitchen in a one and two family dwelling shall have not less than of 50 sf of gross floor area.(4.64m_2)

FBC Section 1208.3

Efficiency Dwelling Units

- An efficiency living unit shall conform to the requirements of the code except as modified herein:
  1. The unit shall have a living room not less than 220 sf (20.4 m_2**)** of floor area. An addition 100 sf (9.3 m_2) of floor area shall be provided for each occupant of such unit in excess of two.
  2. The unit shall be provided with a separate closet**.**

FBC Section 1208.4

Efficiency Dwelling Units

3. The unit shall be provided with a kitchen sink cooking appliance and refrigeration facilities, each having a clear working space of not less than 30 inches (762 mm) in front. Light and ventilation conforming to this code shall be provided.
4. The unit shall be provided with a separate bathroom containing a water closet, lavatory and bathtub or shower.

FBC Section 1208.4

Combustion and Other Pollutants

Combustion Pollutants

Radon * Lead * Asbestos

Biological Pollutants

Sources of Combustion Pollutants

- Tobacco smoking
- Equipment with internal combustion engines
- Other combustion/burning activities/grilling equipment
- Pollutants not exhausted to outside
- Low indoor air pressure
- Auto engine exhausts in attached garages
- Buses idling at schools near A/C Fresh air intakes
- Heating/cooking appliances that burn fossil fuels

Fossil Fuels: *Coal, kerosene, oil, fuel gases or other petroleum or hydrocarbon product that emits carbon monoxide as a by-product of combustion.*

What is Carbon Monoxide (CO)?

- CO is an odorless, colorless gas

What does it do the human body?

- CO reduces the ability of hemoglobin in the blood to carry oxygen
- Symptoms of CO poisoning can be similar to those of flu or allergies
- **Lower doses of CO:** Nausea, dizziness, weakness, headache, confusion, muscle aches
- **Higher doses of CO:** Impaired judgment, paralysis, coma, and even death

Definitions CO Alarms: Section 202

Carbon Monoxide Alarm

A device for the purpose of detecting carbon monoxide, that produces a distinct audible alarm, and is listed or labeled the appropriate standard, either ANSI/UL 2034, Standard for Single and Multiple Station CO Alarms, or UL 2075, Gas and Vapor Detector Sensor, in accordance with its application.

***** *October 1998 Designation changed from CO Detectors to CO Alarms, and alarms were required to sound at 70 ppm*

Carbon Monoxide Protection: Section 916

- Every building for which a permit for new construction is issued having a fossil-fuel-burning heater or appliance, a fireplace, or an attached garage or other feature, fixture or element that emits carbon monoxide as a byproduct of combustion shall have an operational carbon monoxide (CO) **alarm** installed within 10 feet of each room used for sleeping purposes.

FBC Section 916.1

Power Source for CO Alarms

- The requirements of 916.1 shall be satisfied by one of the following alarm installations:
  1. A hard wired CO alarm
  2. A battery powered CO alarm
  3. A hardwired combination CO and smoke alarm
  4. A battery powered combination CO and smoke alarm

FBC Section 916.1.1

- Combination smoke/carbon monoxide alarms shall be listed or labeled by a **Nationally Recognized Testing Laboratory.**

FBC Section 916.1.2

Exception to Section 916.1.2

An approved operational CO alarm shall be installed inside or directly outside each room or area within a hospital, inpatient hospice facility or nursing home facility or a new state correctional institution where a fossil-fuel burning heater, engine, or appliance is located. The CO detector shall be connected to fire-alarm system of the hospital, inpatient hospice facility, or nursing home facility as a supervisory signal.

FBC Section 916.1.2

- Fire Alarm Systems
  Consist of:
  - Control Panel
  - Fire Detectors
  - Signal Boxes
  - Horns and Lights
  - Back up Battery

Exception to Section 916.1.2

- This section shall not apply to existing buildings that are undergoing alterations or repair unless the alteration is as addition as defined in section 916.1.3.
- Addition shall mean an extension or increase in floor area, # of stories, or height of a building

FBC Section 916.1.2 & 916.1.3

- Fire Alarm Systems
  Consist of:
  - Control Panel
  - Fire Detectors
  - Signal Boxes
  - Horns and Lights
  - Back up Battery

Radon Detectors

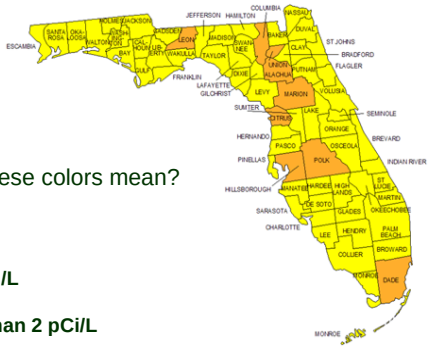
Measure Radon in Pico Curies per litre

4 pCi/L considered excessive

Radon Remediation

- Sealing foundation cracks (alone not effective)
- Soil gas suction- draws radon out of soil and exhausts out through roof using an in-line fan
- Reduce pressure-driven air flow

Florida Radon Map



What do these colors mean?

- > 4 pCi/L
- 2-4 pCi/L
- Less than 2 pCi/L

Ozone Production

- "Good up high-Bad nearby", EPA distinction between ozone in upper and lower atmosphere.
- Ozone upper atmosphere- *stratospheric ozone,*

  helps filter out damaging ultraviolet radiation
- Ozone lower atmosphere-*troposphere* ozone,

  (the air we breath) can be harmful to respiratory system.

Asbestos

- Used in many building materials until late 70's – textured paints until '77
- Highly regulated today
- Visual detection difficult
- Best left undisturbed
- Poor condition, Renovation or Removal is Health Threat (asbestosis, mesothelioma and cancer)
- Cover, seal or encapsulate
- Professional Removal: AHERA-Accredited Building Inspector

Asbestos materials in removed carpet

***A**sbestos **H**azardous **E**mergency **R**esponse **A**ct*

Lead-Based Paint & Remodeling

- Remodelers- Keep accurate records
- Never sand or scrape old paint
- Lead Dust – found in old PVC blinds etc
- Lead Dust Control – HEPA vacuum
- Duct tape for Lead chips
- Lead- Based Paint Pre-renovation Education (Lead PRE) Rule- June 1999
  - * Pre-1978 housing
  - * Contractors disturbing more than 2 s/f of lead paint
  - ***** Distribution of EPA pamphlet:

Biological Pollutants (Bioaerosols)

Bioaerosols	**Sources**
Pollen	Outdoor plants
Spores	Mold (in/outdoors)
Dust	Animal dander, skin cells, insect parts & excrements
Bacteria	Humans, Water & Soil
Viruses	Humans
Misc.	Protozoa, algae, fungi, mammals, anthropods etc.

What is Stachybotrys?

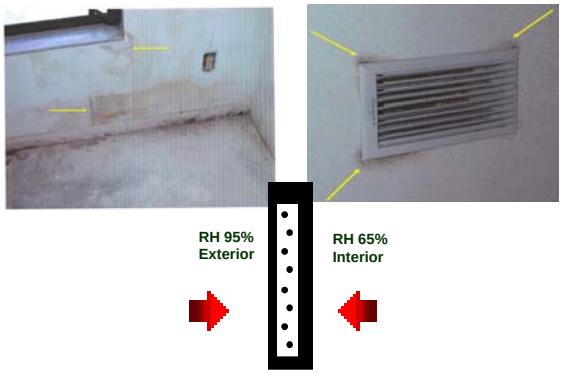
Greenish-black, slimy mold that needs abundant moisture.
May contain mycotoxin Satraoxin H.

Some fungi produce mycotoxins that are toxic, known as toxicants, ***aspergillus***
Mold-produced toxins such as ***afllatoxins and ochratoxin A*** *are known carcinogens*

Can grow on:
Cardboard
Wallboard
Ceiling tiles
Wallpaper
Newspaper
Thermal Insulation

Does not grow on:
Plastic
Mold Resistant WB
Vinyl
Concrete
Linoleum

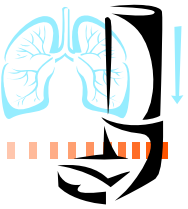
What caused this? And this?



Asthma Facts:

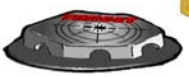
"Asthma is known as the disease with a thousand faces"

- Serious lung disease
- Effects Estimated 20.3 million Americans
- Most common chronic childhood disease affecting 1 in13 school-aged children
- Fastest rise in preschool age group
- Triggers: Domestic birds/cat allergens & dog dander
- Secondhand smoke
- Formaldehyde; nitrous oxides; Fragrances
- Rhinoviruses
- Respiratory infectious agents; fungi, molds, cockroach allergens, **dust mites**, bed bugs



Pesticide-free Treatments

- Pesticide free mesh under foundation
- Containerized insect baits rather than broadcast treatments
- Boric acid tablets
- Nematodes
- Heat Wave
- Bora-care wood treatments



Surrounding Materials

Interior Finishes & Materials

Volatile Organic Compounds

Interior Finishes: FL Code

- Fire-Resistance Requirements for Plaster

  Thickness of Plaster:

  The minimum thickness of gypsum plaster or Portland cement plaster used in a fire resistance-rated system shall be determined by the prescribed fire tests. The plaster thickness shall be measured from the face of the lath where applied to gypsum lath or metal lath.

  FBC Section 718.1

Interior Finishes: FL Code

- Plaster Equivalents

  For fire-resistance purposes, 0.5 inch (12.7mm) of un-sanded gypsum plaster shall be deemed equivalent to 0.75 inch (19.1 mm) of one-to-three gypsum sand plaster or 1 inch (25 mm) of Portland cement sand plaster.

  FBC Section 718.2

Interior Wall and Ceiling Finish

- **Scope.**

  Provisions of this chapter shall govern the use of materials used as *interior finishes*, *trim* and *decorative materials*..

  FBC Section 801.1

Interior Wall and Ceiling Finish

- The provisions of Section 803 shall limit the allowable fire performance and smoke development of *interior wall and ceiling finish* materials based on occupancy classification.

FBC Section 801.2

Interior Wall and Ceiling Finish

- **Interior floor finish.**
  The provisions of Section 804 shall limit the allowable fire performance of *interior floor finish* materials based on occupancy classification..

FBC Section 801.3

Interior Finishes: FL Code

- Decorative materials and trim shall be restricted by combustibility and the flame propagation performance criteria of NFPA 701, in accordance with Section 806

FBC Section 801.4

Interior Finishes: FL Code

- **Applicability**
  For buildings in flood hazard areas, as established in Section 1612.3, interior finishes, trim and decorative materials that extend below the elevation required by Section 1612.4 shall be flood-damage-resistant materials.

FBC Section 801.5

Combustible Materials: Application

- Application
  Combustible materials shall be permitted to be used as finish for walls, ceilings, floors and other interior surfaces of buildings. **FBC Section 801.6**
- Interior Finishes: Windows
  Show windows in the exterior walls of the first story above grade shall be permitted to be of wood or of unprotected metal framing. **FBC Section 801.7**

Interior Finishes: Foam Plastics

- Foam Plastics
  Foam plastics shall not be used as interior finish except as provided in 803.4 or trim except as provided in 806.3 or 2604.2. This section shall apply both to exposed foam plastics and to foam plastics used in conjunction with a textile or vinyl facing or cover.

FBC Section 801.8

Interior Finishes: General

- General

  Interior wall and ceiling finishes shall be classified in accordance with ASTM E-84 or UL 723. Such interior finish materials shall be grouped in the following classes in accordance with their flame spread and smoke-developed indexes.

FBC Section 803.1.1 continued >

Interior Finishes: General

- Class A Flame Spread 0-25; Smoke Developed 0-450
- Class B Flame Spread 26-75; 0-450
- Class C Flame Spread 76-200 0-450

  Exception: materials other than textiles, tested in accordance with Section 803.1.2

FBC Section 803.1.1

Room Corner Test for Interior Wall or Ceiling Finishes

- Interior wall and ceiling finishes, shall be permitted to be tested in accordance with NFPA 286.
- Finishes tested in accordance with NFPA 286 shall comply with Section 803.1.2.1.

FBC Section 803.1.2

Interior Finishes: Acceptance Criteria

During the 40kW exposure, the interior finish shall comply with Item **1.** During the 160 kW exposure, the interior finish shall comply with Item **2.**

During the entire test, the interior finish shall comply with Items **3** and **4.**

During the 40kW exposure, flames shall not spread to the ceiling.

During the 160 kW exposure, the interior finish shall comply with the following: continued >

FBC Section 803.1.2.1

Interior Finishes: Acceptance Criteria

2.1. Flame shall not spread outer extremity of the sample on any wall or ceiling.

2.2 Flashover, as defined in NFPA 286 test shall not occur.

3. The peak rate of heat release throughout the NFPA 286 test shall not exceed 800 kW.

4. The total smoke released throughout the NFPA 286 test shall not exceed 1,000 m^2

FBC Section 803.1.2.1

Interior Finish Requirements

- Interior finish requirements based on group

  Interior wall and ceiling finish shall have a flame spread index not greater than that specified in Table 803.9 for the group and location designated. Interior wall and ceiling finish materials, other than textiles, tested in accordance with NFPA 286 and meeting the acceptance criteria of Section 803.1.2.1, shall be permitted to be used where a Class A classification in accordance with ASTM E 84 or UL 723 is required.

FBC Section 803.9

Interior Finishes: Stability

- Interior finish materials regulated by this chapter shall be applied or otherwise fastened in such a manner that such materials will not readily become detached where subjected to room temperatures of 200 degrees F (93 degrees C) for not less than 30 minutes.

- **FBC Section 803.10**

Interior Finishes: Application

- Where interior finish materials are applied on walls, ceilings or structural elements required to have a fire-resistance rating or to be of noncombustible construction, they shall comply with the provisions of this section.

FBC Section 803.11

Interior Finishes: Direct Attachment & Furred Construction

Where walls & ceilings are required by any provision in this code to be of fire-resistance-rated or noncombustible construction, the interior finish material shall be applied directly against such construction or to furring strips not exceeding 1.75 inches (44 mm) applied directly against such surfaces. The intervening spaces between such furring strips shall comply with one of the following:

FBC Section 803.11.1

Interior Finishes: Direct Attachment & Furred Construction

1. Be filled with material that is inorganic or noncombustible; or
2. Be filled with material that meets the requirements of a Class A material in accordance with Section 803.1.1 or 803.1.2; or
3. Be fire blocked at a maximum of 8 feet (2438 mm) in any direction in accordance w/ Section 717.

FBC Section 803.11.1

Interior Finishes: Set-out Construction

Where walls and ceilings are required to be fire-resistance-rated or non-combustible construction and walls are set out or ceilings are dropped distances greater than specified in Section 803.11.1,

Class A finish materials in accordance with 803.1.1 or 803.1.2, shall be used except where interior finish materials are protected on both sides by an automatic sprinkler system in accordance with 903.3.1.1 or 903.3.1.2 or attached to noncombustible backing or furring strips installed as specified in Section 803.11.1.

FBC Section 803.11.2

continued >

Interior Finishes: Set-out Construction

The hangers and assembly members of such dropped ceilings that are below the main ceiling line shall be of noncombustible materials, except that in Type III And V construction, fire-retardant-treated wood shall be permitted. The construction of each set-out wall shall be of fire-resistance-rated construction as required elsewhere in this code.

FBC Section 803.11.2

Interior Finishes: Heavy Timber (HT) Construction

Wall and ceiling finishes of all classes as permitted in this chapter that are installed directly against the wood decking or planking of Type IV construction or to wood furring strips applied directly to the wood decking or planking shall be fireblocked as specified in Section 803.11.1.

FBC Section 803.11.3

Interior Finishes: Materials

- An interior wall or ceiling finish that is not more than 0.25 inch (6.4mm) thick shall be applied directly against a noncombustible backing.
- Exceptions:
  1. noncombustible materials,
  2. Materials where the qualifying tests were made with the material suspended or furred out from the noncombustible backing.

FBC Section 803.11.4

Interior Finishes: Textiles

- Where used as interior wall or ceiling finish materials, textiles, including materials having woven or nonwoven, napped, tufted, looped or similar surface and carpet and similar textile materials, shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of Section 803.1.2, 803.1.3 or 803.1.4.

FBC Section 803.5

Interior Finishes: General

- Interior floor finish and floor covering materials shall comply with Sections 804.2 through 804.4.1
- Exceptions: Floor finishes and floor coverings of a traditional type such as wood, vinyl, linoleum or terrazzo, and resilient floor covering materials that are not comprised of fibers.

FBC Section 804.1

Interior Finishes: Classification

- Interior floor finish and floor covering materials required by Section 804.4.1 to be of Class I or II materials shall be classified in accordance with NFPA 253. The classification referred to herein corresponds to the classifications determined by NFPA 253 as follows: Class I, 0.45 watts/cm^2 or greater; Class II, 0.22 watts/cm^2 or greater.

FBC Section 804.2

Section 804.4.1 Minimum critical radiant flux

- Interior floor finish and floor covering materials in exit enclosures, exit passageways and corridors shall not be less than Class I in Groups I-1, I-2 and I-3 and not less than Class II in Groups A, B, E, H, M, R-1, R-2 and S. In all areas, floor covering materials shall comply with the DOC FF-1 "pill test" (CPSC 16 CFR, Part 1630).

804.4.1 Exception:

- Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, Class II materials are permitted in any area where Class I materials are required, and materials complying with the DOC FF-1 “pill test” (CPSC 16 CFR, Part 1630) are permitted in any area where Class II materials are required.

Interior Finishes: General Requirements

- In occupancies in Groups A, E, I and R-1 and dormitories in Group R-2, curtains, draperies, hangings and other decorative materials suspended from walls or ceilings shall meet the flame propagation performance criteria of NFPA 701 in accordance with Section 806.2 or be noncombustible.

FBC Section 806.1 continued >

Interior Finishes: General Requirements Exceptions

- 1. Curtains, draperies, hangings and other decorative materials suspended from walls of sleeping units and dwelling units in dormitories in Group R-2 protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1 and such materials are limited to not more than 50 percent of the aggregate area of walls.

FBC Section 806.1 continued >

Interior Finishes: General Requirements Exceptions

- 2. Decorative materials, including, but not limited to, photographs and paintings in ormitories in Group R-2 where such materials are of limited quantities such that a hazard of fire development or spread is not present.

FBC Section 806.1 continued >

Interior Finishes: General

- In Groups I-1 and I-2, combustible decorative materials shall meet the flame propagation criteria of NFPA 701 unless the decorative materials, including, but not limited to, photographs and paintings, are such limited quantities that a hazard of fire development or spread is not present.

FBC Section 806.1 continued>

Interior Finishes: General

- In Group I-3, combustible decorative materials are prohibited.
- Fixed or movable walls and partitions, paneling, wall pads and crash pads applied structurally or for decoration acoustical correction, surface insulation or other purposes shall be considered interior finish if they cover 10 % or more of the wall or of the ceiling area, and shall not be considered decorative materials or furnishings.

FBC Section 806.1 continued >

Interior Finishes: General

- In Group B and M occupancies, fabric partitions suspended from the ceiling and not supported by the floor shall meet the flame propagation performance criteria in accordance with Section 806.2 and NFPA 701 or shall be noncombustible.

FBC Section 806.1

Interior Finishes: Noncombustible

The permissible amount of noncombustible decorative material shall not be limited.

FBC Section 806.1.1

Interior Finishes: Combustible

The permissible amount of combustible decorative materials meeting the flame propagation performance criteria of NFPA 701 shall not exceed 10 percent of the specific wall or ceiling area to which it is attached.

FBC Section 806.1.2

Interior Finishes: Combustible

- **Exceptions:**

  1. In auditoriums in Group A, the permissible amount of decorative material meeting the flame propagation performance criteria of NFPA 701 shall not exceed 75 percent of the aggregate wall area where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 and where the material is installed in accordance with 803.11.

FBC Section 806.1.2

Interior Finishes: Combustible

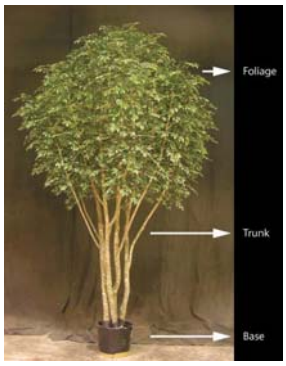
- Exceptions

  2. The amount of fabric partitions suspended from the ceiling and not supported by the floor in Group B and M occupancies shall not be limited.

FBC Section 806.1.2

Artificial Plants

- **IFC for Artificial Plants**
- **The 2009 edition of International Fire Code states in Section 806.2**
- **That artificial decorative vegetation shall meet the flame propagation performance criteria of NFPA 701. Meeting the flame propagation performance criteria of NFPA 701 shall be documented and certified by the manufacturer in an approved manner. NFPA 1 for Artificial Plants**
- **The 2006 edition of NFPA 1: Uniform Fire Code states in Chapter 20 20.1.5.4.1 – Furnishings, Decorations and Scenery 20.1.4.4.1 Fabrics and films used for decorative purposes, all draperies and curtains, and similar furnishings shall be in accordance with the provisions of 12.6.2 [101:12.7.4.1; 101:13.7.4.1]**
- **12.6.2 Where required by the applicable provisions of this Code, draperies, curtains and other similar loosely hanging furnishings and decorations shall meet the flame propagation performance criteria contained in the NFPA 701, Standard Methods of Fire Test for Flame Propagation of Textiles and Films [101:10.3.1]**

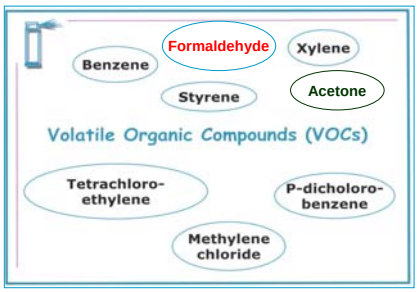


Artificial Plants

- Silk or even plastic pose the greatest risk
- Plastic generates lots of smoke
- Smoke is greatest danger to life safety

Volatile Organic Compounds: VOC's

VOC Sources



IAQ Management: According to LEED

- Prior to occupancy, demonstrate through testing, that the maximum concentrations of the following do not exceed:
  - *Particulates: 50 micrograms per cu. Meter
  - *TVOC: 500 micrograms per cu. Meter
  - *4-Phenylcyclohexene: 6.5 micrograms per cu. Meter*
  - *CO: 9 parts per million (ppm) /no greater than 2 ppm above outdoor levels
  - *Formaldehyde: 50 parts per billion=.05 ppm

Formaldehyde *ID Sources:

Particleboard, MDF
Cabinetry, Shelving
Countertops
Veneered/Laminate
Furniture/floors
Hardwood
Plywood & paneling
Underlayment
Permanent Press
Drapery Fabrics/Sizing
Carpeting
Combustion Products
Vinyl Wallcovering
Vinyl Flooring

Interior Design Sources

CARB RAW PANEL FORMALDEHYDE EMISSION CEILINGS AND IMPLEMENTATION SCHEDULE

Product	Phase I Levels (ppm) Effective Dates	Phase II Levels (ppm) Effective Dates
Hardwood Plywood – Veneer Core	0.08 Jan. 1, 2009	0.05 Jan. 1, 2010
Hardwood Plywood – Composite Core*	0.08 July 1, 2009	0.05 July 1, 2012
Particleboard	0.18 Jan. 1, 2009	0.09 Jan. 1, 2011
MDF	0.21 Jan. 1, 2009	0.11 Jan. 1, 2011
Thin MDF**	0.21 Jan. 1, 2009	0.13 Jan. 1, 2012

**Hardwood plywood panel using particleboard or MDF in the core.*
***Maximum thickness of 8mm.*

Reduce Formaldehyde & VOC's

In Existing Homes: Construction:

- ☐Identify sources
- ☐Coat surfaces materials
- ☐Control RH/Temp
- ☐Ventilate

In New: Select Products with Low or No *Formaldehyde/VOC's

**Detection through smell, environmental testing and "Do-it-yourself" kits*

Summary: Health Safety Welfare

- Improperly designed, constructed and/or maintained homes/ buildings can result in numerous problems for the owner.
- Crucial to make effort to ensure that design & professional services do not cause or exacerbate problems for the home or building owner.
- Licensing involves HSW for the public

"Be responsible and accountable… Be a licensed professional ."

Comments and/or Questions???

Contact Info: eco decor

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Thank You!