

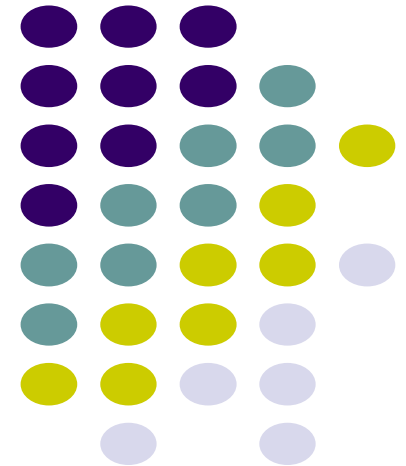
# City of Scottsdale Energy Code Adoption



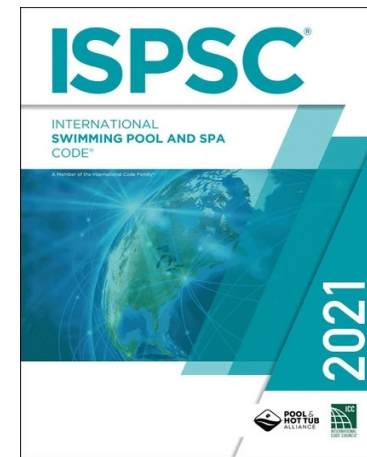
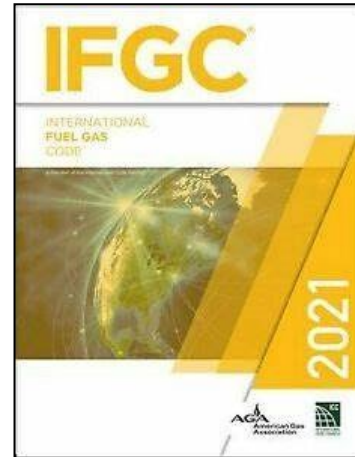
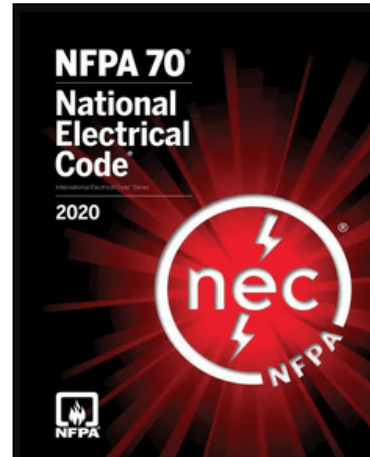
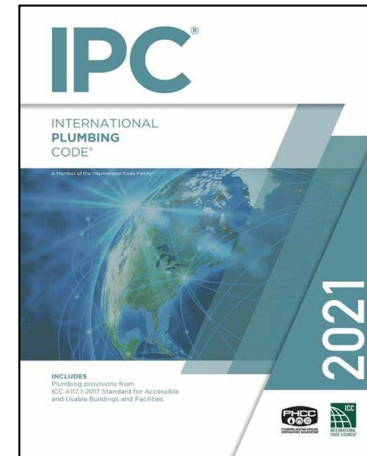
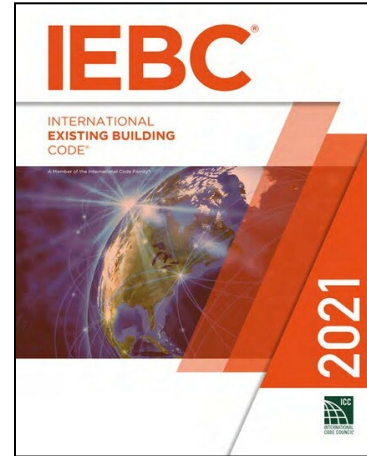
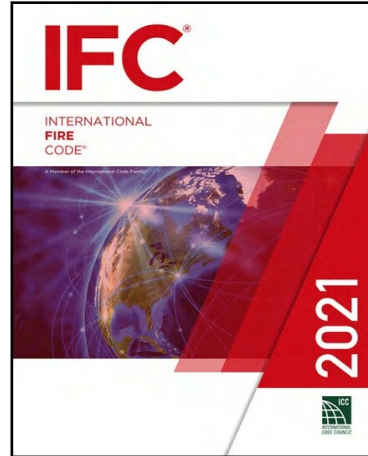
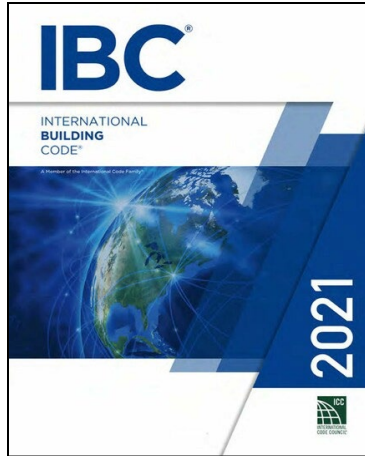
## Top 10 Residential Energy Code Changes 2021 International Energy Conservation Code

December 22, 2022

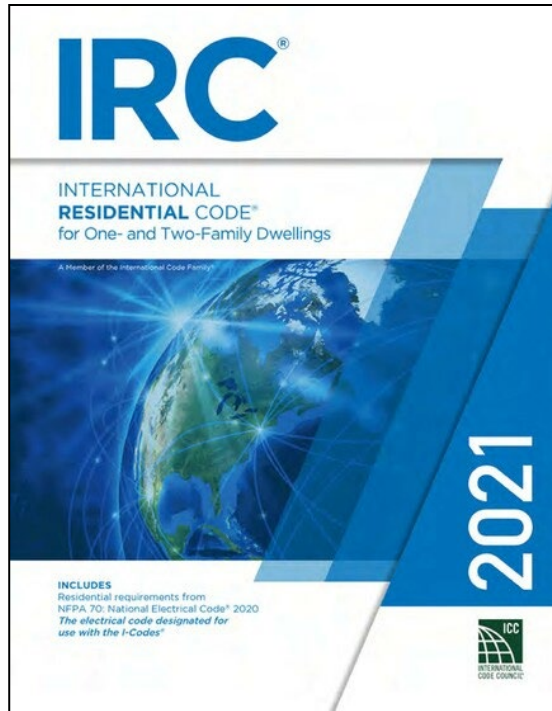
Anthony Floyd, FAIA, LEED BD+C, CEM  
Office of Environmental Initiatives  
Planning and Development  
Community and Economic Development  
City of Scottsdale



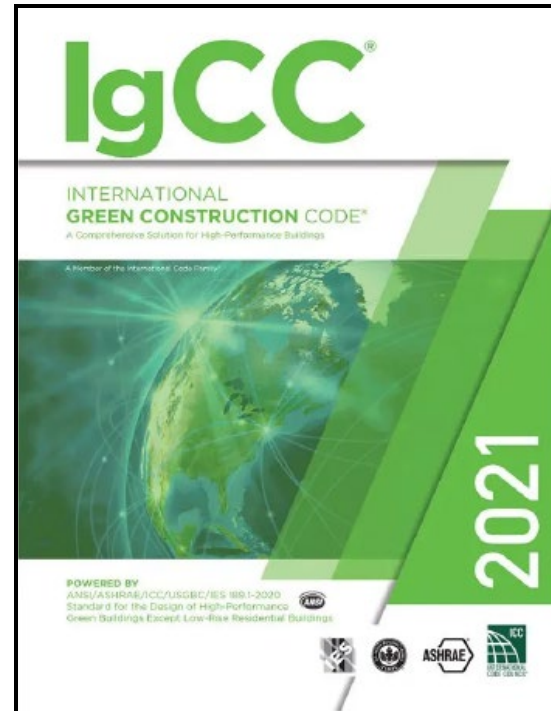
# These codes are effective January 1, 2023

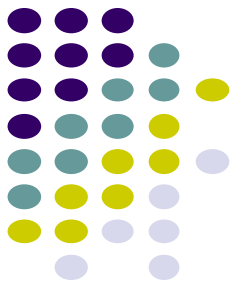


# The IRC and IECC codes are effective January 7, 2023



# The IgCC is effective July 1, 2023



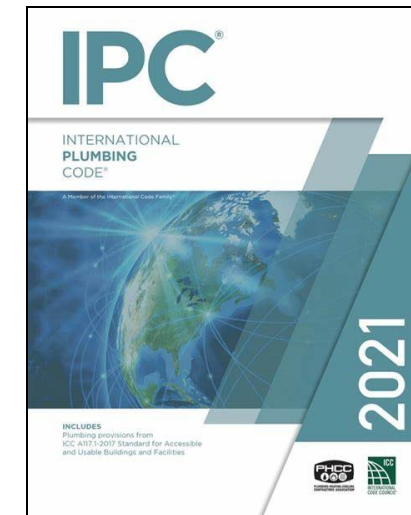


# IRC/IPC Amendments

## Single, Multifamily and Commercial

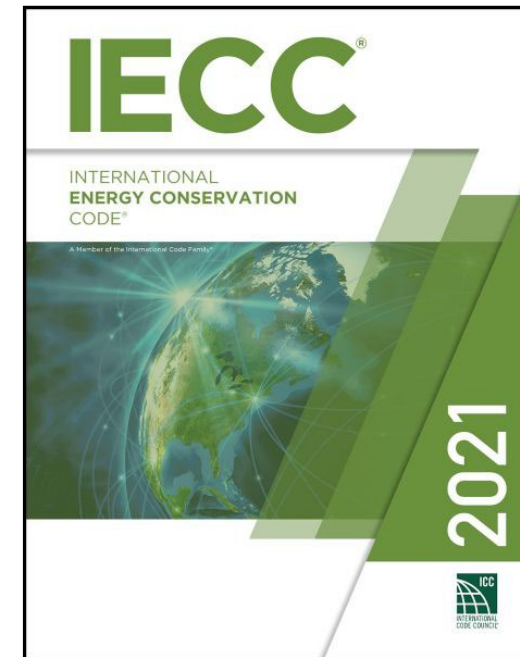
### Water Efficiency addressed in plumbing code

- High-efficiency plumbing fixtures and fittings
  - Water closets, urinals, lavatory faucets, showerheads, kitchen faucets
- Efficient hot water delivery
  - Demand-controlled recirc. pump for remotely located water heaters
- Water-bottle filling stations
  - Water-bottle filling stations for all drinking fountains



# IRC/IECC for Single Family Dwellings

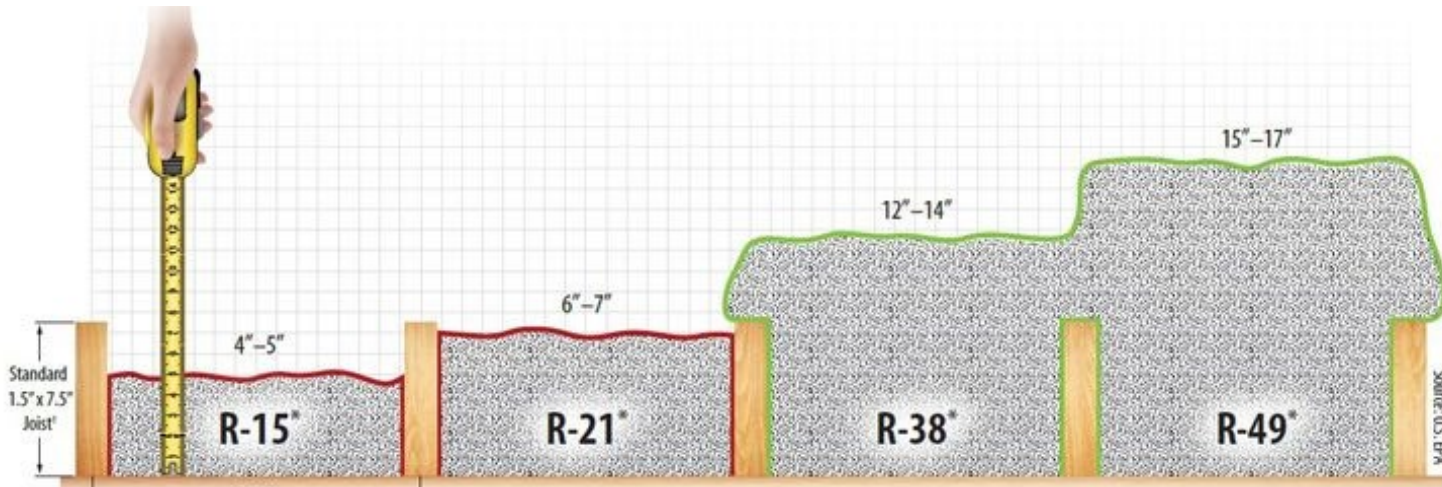
- **Top 10 Energy code Changes**
  1. R-38 ceiling insulation
  2. Cool roofs for low slope roofs
  3. Duct leakage test
  4. Mechanical ventilation flow rate test
  5. High-efficacy lighting (LED or similar)
  6. Interior lighting controls
  7. Exterior lighting controls
  8. Electric vehicle capable charging
  9. Additional efficiency package options
  10. Rooftop solar-ready zones



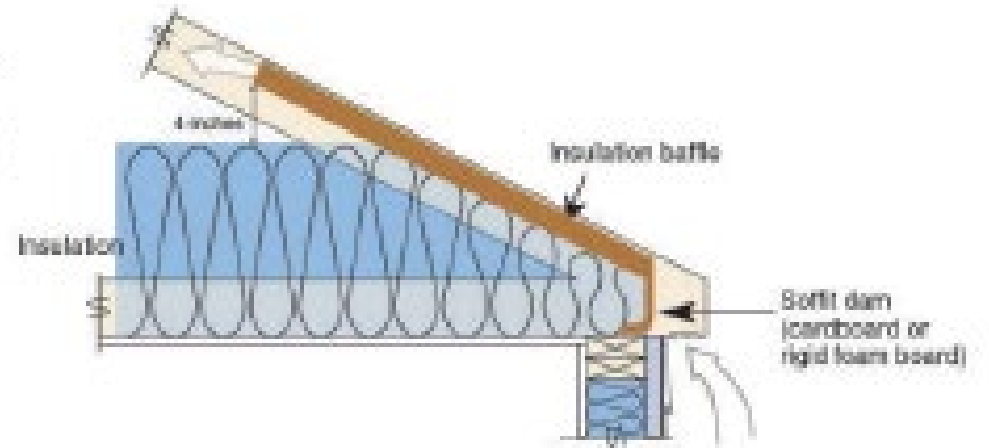
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# R-49 Ceiling Insulation – R402.1.3

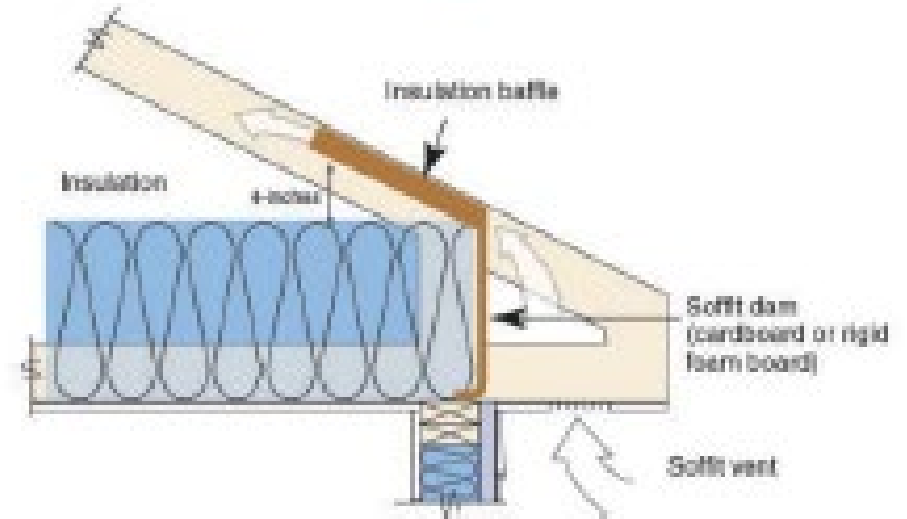
Prescriptive requirement

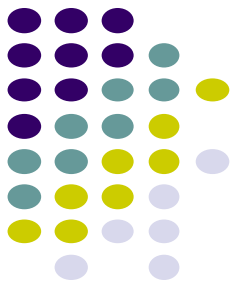


Standard Truss with tapered insulation depth



Energy Truss with full height insulation (recommended)





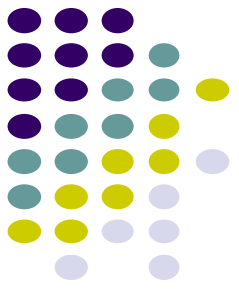
## 2 Cool/Light Reflective Coated Roofs

### Low Slope roofs (less than 2 in 12 slope) – R402.6

- Minimum solar reflectance index (SRI) of 64 over conditioned and non-conditioned spaces







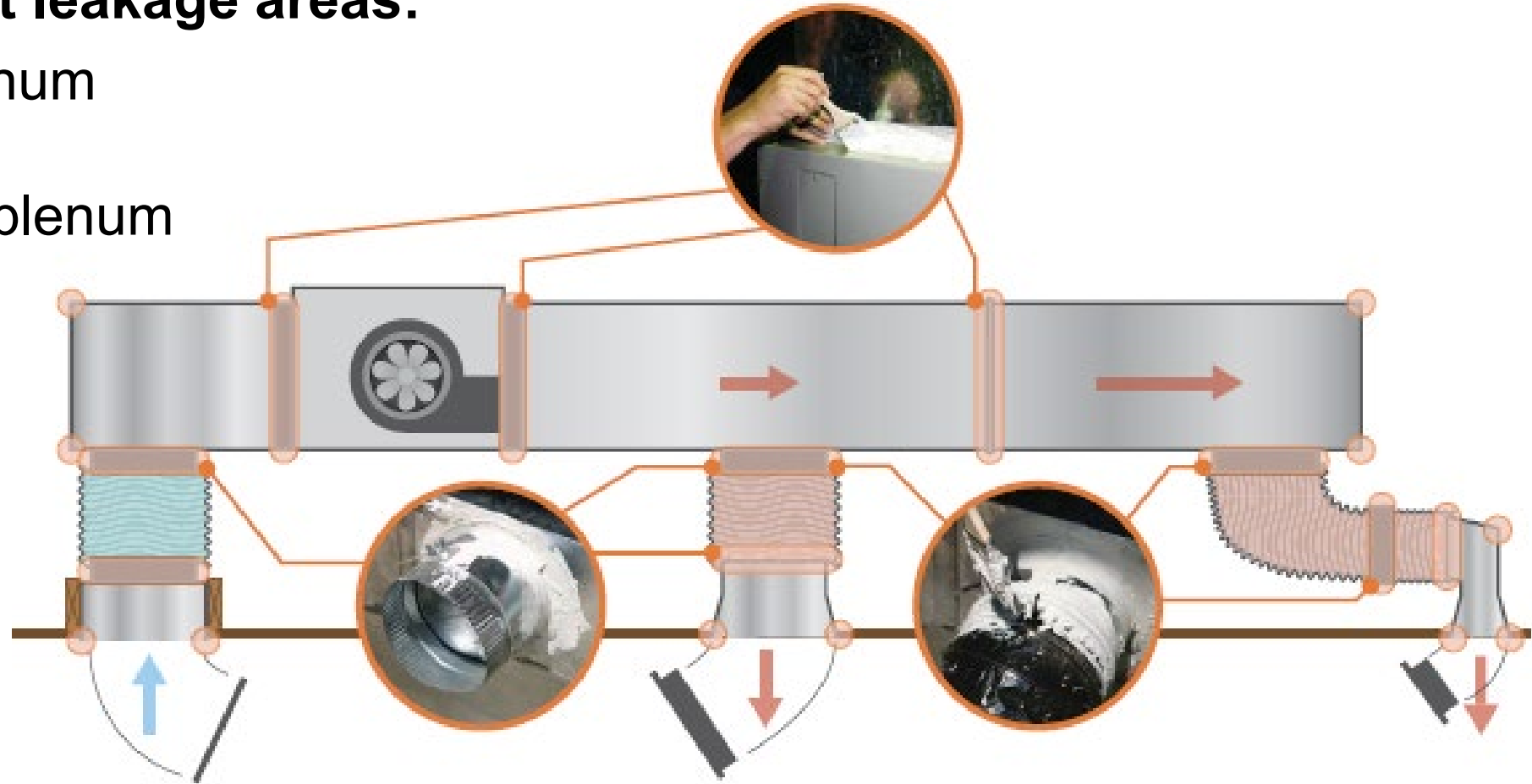
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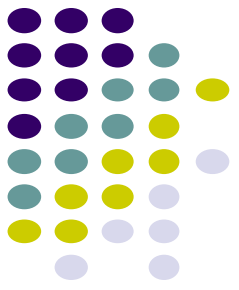
## Duct Leakage Testing – R403.3.5

### Most common duct leakage areas:

- Air handler to plenum
- Boot to gypsum
- Take-off collar to plenum
- Splices
- Connections
- Return platforms

Applies to ducts in both conditioned and unconditioned spaces.



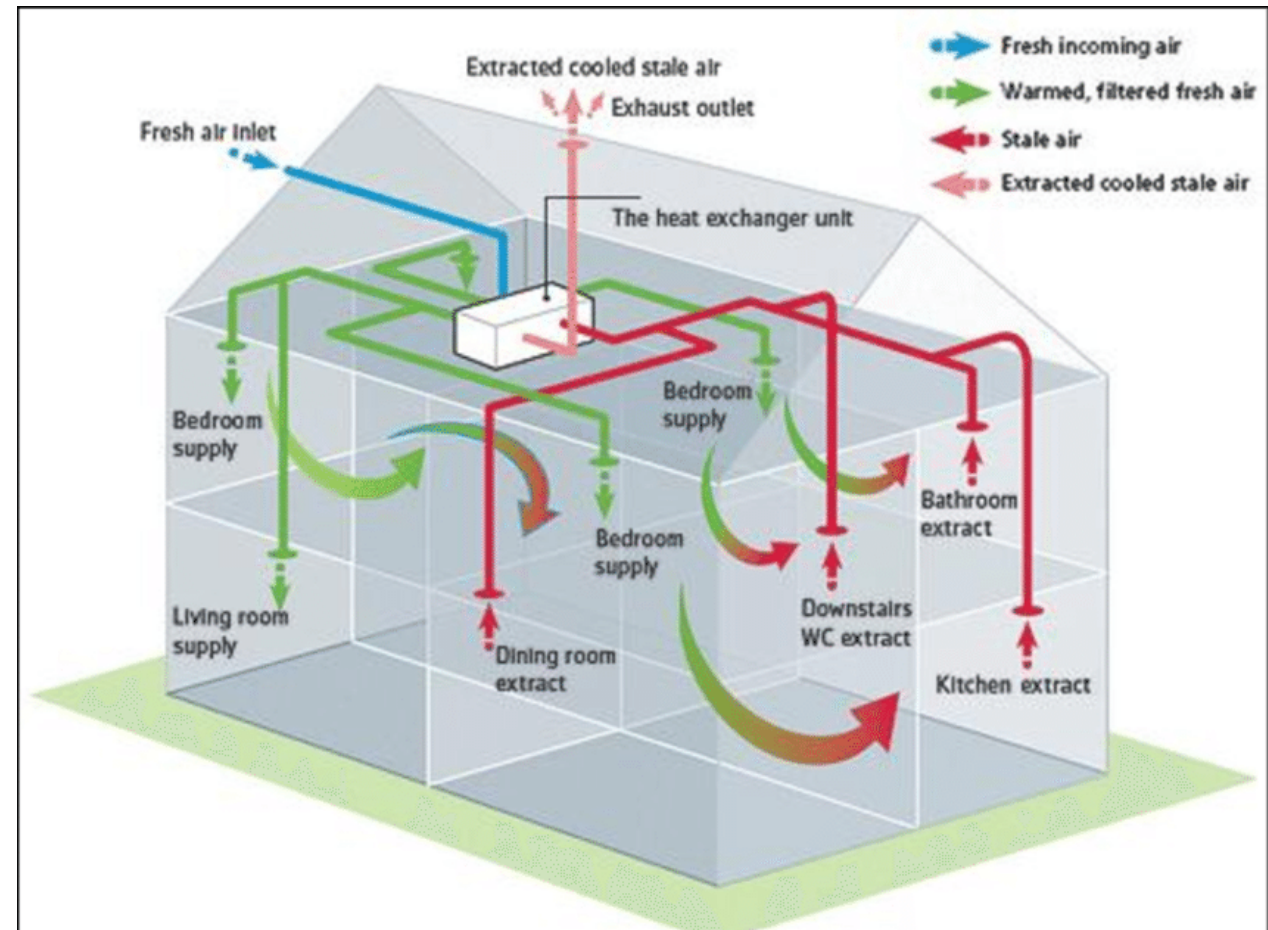


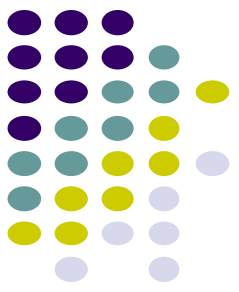
## 4 Mechanical Ventilation Flow Rate Testing – R403.6.3

**R403.6.3 Testing.** Mechanical ventilation systems shall be tested and verified to provide the minimum ventilation flow rates required by Section R403.6.

### **R403.6 Mechanical ventilation.**

Dwelling units shall be provided with ventilation that complies with the Section M1505 of the *International Residential Code*. Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the *ventilation* system is not operating.



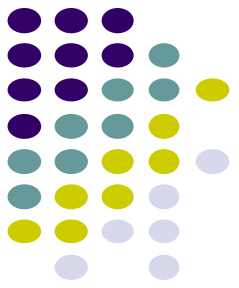


# Mechanical Ventilation Airflow Rate

Ventilation rate in cubic feet per minute =  $(0.01 \times \text{total square foot area of house}) + [7.5 \times (\text{number of bedrooms} + 1)]$   
**(Equation 15-1)**

**TABLE M1505.4.3(1)**  
**CONTINUOUS WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS**

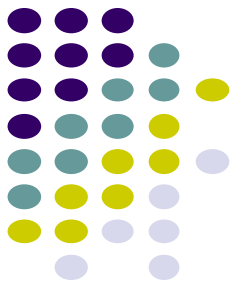
DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	0-1	2-3	4-5	6-7	> 7
	Airflow in CFM				
< 1,500	30	45	60	75	90
1,501-3,000	45	60	75	90	105
3,001-4,500	60	75	90	105	120
4,501-6,000	75	90	105	120	135
6,001-7,500	90	105	120	135	150
> 7,500	105	120	135	150	165



# Energy Efficiency Certificate – R401.3

- A permanent certificate shall be completed by the builder or other *approved* party and posted on a wall in the space where the furnace is located, a utility room or other *approved* location.
  1. *R*-values of insulation in/on ceilings, roofs and walls.
  2. *U*-factors and *solar heat gain coefficient*.
  3. Results from duct leakage and envelope air leakage testing.
  4. Types, sizes and efficiencies of heating, cooling and water-heating equipment.

Energy Efficiency Certificate			
Permit No.	_____		
Address	_____		
Insulation Ratings		R-Value	
Roof/Ceiling			
	Without attic	<i>R</i> -	
Walls	Frame	<i>R</i> -	
	Mass	<i>R</i> -	
	Basement	<i>R</i> -	
	Crawlspace	<i>R</i> -	
Floors	Over unconditioned space	<i>R</i> -	
	Slab-edge (depth)	<i>R</i> - / ft.	
Ducts	Frame	<i>R</i> -	
Fenestration Ratings		NFRC U-Factor	NFRC SHGC
Opaque doors	<i>U</i> -		
Windows	<i>U</i> -		
Skylights	<i>U</i> -		
Equipment Performance		Efficiency	
Heating systems	HSPF/AFU <sub>E</sub>		
Cooling systems	COP/SEER		
Water Heater/Bolan	EF <sub>1</sub> or <i>E</i> <sub>2</sub>		
Builder/Designer	_____		
Certified by	_____	Date	_____
Adopted Code Edition	_____		

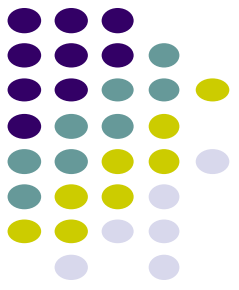


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# High-Efficacy Lighting – R404.1

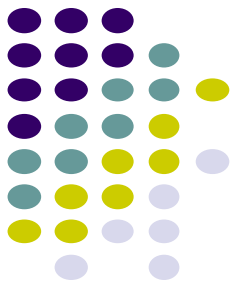
All permanently installed lighting fixtures shall contain only high-efficacy lighting.





**HIGH-EFFICACY LIGHT SOURCES.** Any lamp with an efficacy of not less than 65 lumens per watt, or luminaires with an efficacy of not less than 45 lumens per watt.





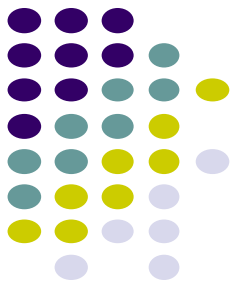
## 6 Interior Lighting Controls – R404.2

Permanently installed interior lighting fixtures shall be controlled with either a dimmer, an occupant sensor control or other control such as an automatic timer shut-off switch.

Exceptions: Bathrooms, hallways & lighting designed for safety or security



Note: Dimmers and occupant sensors have manual controls to turn the lights on or off.



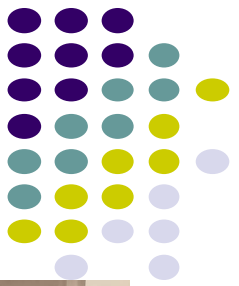
# 7

## Exterior Lighting Controls – R404.3

Where the total permanently installed exterior lighting power is greater than 30 watts, the permanently installed exterior lighting shall have automatic shut-off actions







# 8 Electric Vehicle Charging Capacity

## R404.1

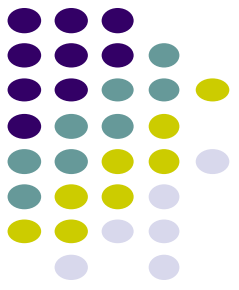
- **EV-capable for new single-family homes**
  - Reserve electrical service panel space for a full size 2-pole circuit breaker labeled “Future EV Charging”
  - A raceway shall be installed from the electrical service panel to a location within the garage, where it shall terminate in a junction box or outlet and be labeled “Future EV Charging”.



9

# Additional Efficiency Package Options

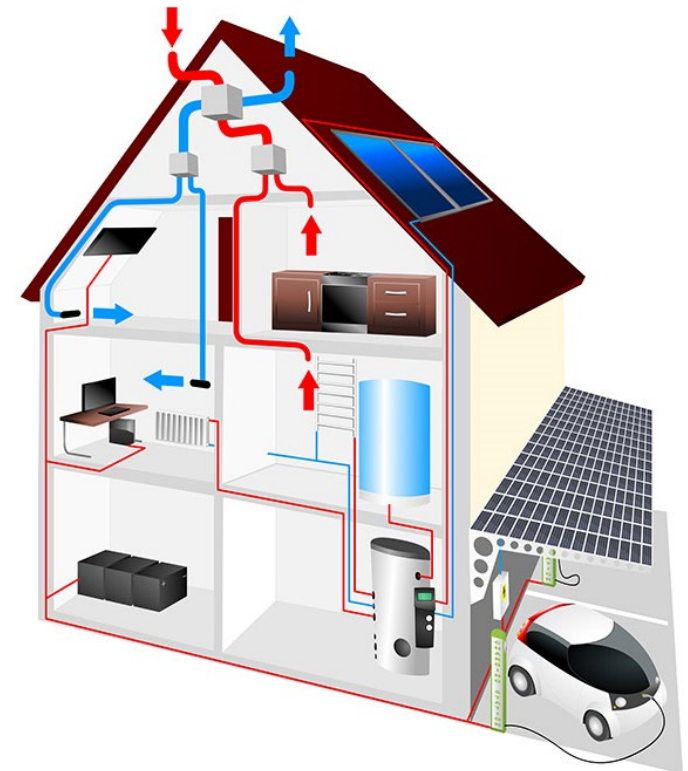
## R408.2 – select one option or 5% reduced energy

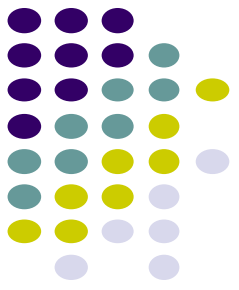


1. Enhanced envelope performance option
2. More efficient HVAC equipment performance
3. More efficient service water-heating
4. More efficient thermal duct distribution system
5. Efficient ventilation system

### 6. **On-site renewable energy**

- Generate not less than 2 watts/sq. ft. of total conditioned floor area or 50% of annual estimated energy use





# 10 Solar-Ready Zones – RB103

- Minimum 10% of roof area but not less than 300 sq. ft. free and clear of obstructions including mechanical equipment and vents
- Provide electrical pathway for conduit run from solar-ready zone to electrical service panel with reserved space for 2-pole circuit breaker
- Capped roof penetration sleeve shall be provided on roofs with a slope of 1 in 12 or less



Credit: Carlisle Roof Foam

**Planning and Development**  
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