

## Planning & Development Department

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Physical (By Appointment Only): 155 Johnston Street, Rock Hill, SC 29730

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## 2009 International Energy Conservation Code Requirements for Residential

The 2009 International Energy Conservation Code (IECC) is the energy code enforced for all buildings.

### Plan submittals

All residential plan submittals must include the following for review and approval:

- Window U-factors, R-values and window Solar Heat Gain Coefficients (SHGC) should be provided on the construction drawings. The manufacturer's certification is to be with the windows at the time of the framing inspection.
- R-values for all insulation should be noted.
- Mechanical calculations must also be submitted with plans. ACCA Manual J, S and D shall be used for the mechanical calculations.
- REScheck - A REScheck form showing energy code information is required for any new construction or addition. A REScheck form can be completed online and printed out by going to <https://energycode.pnl.gov/rescheck>.
- Copy of builder's air leakage inspection certification (if applicable)

IECC Residential Insulation Requirements	
Minimum acceptable levels	
Ceilings	R-30
Wood Frame Walls	R-13
Floors	R-19
Crawl Space Walls	R-5/13 (first value is for walls with continuous insulation, the second is for insulation placed in a framing cavity (stud walls)). Either method is acceptable.
Ductwork	R-8 for ductwork outside of conditioned space. R-6 for ducts inside floor trusses. Ducts completely inside the building thermal envelope need not be insulated.
Maximum acceptable levels	
Windows & Skylights	Window U-Factor 0.50 Impact rated fenestration is 0.65 Skylight U-Factor 0.65 Window & Skylight SHGC 0.30

## Energy Code Inspections

The 2009 IECC states that all new buildings and additions are required to have an air leakage test of the building thermal envelope. Residential builders have the option of performing the visual air leakage inspection of their homes themselves, provided that they:

- 1) Submit a copy of their certification with their permit application
- 2) Complete the inspection certificate on the last page of this information packet

Please note that City building inspectors will perform the air leakage visual inspection along with the framing “all roughs” inspection if the builder does not choose to do so.

Additionally, the 2018 International Residential Code currently in effect requires a water-resistive barrier applied over studs or sheathing of all exterior walls. There is no exception for vinyl siding or other coverings. One layer of No. 15 asphalt felt complying with ASTM D 226 or other approved water resistive barrier that is free from breaks or holes may be used. The material is to be applied horizontally with the upper layer lapped over the lower layer not less than 2". Where joints occur, the material shall be lapped not less than 6" and shall be continuous to the top of the walls. It is not required under the paperbacked stucco lath when the paper backing is an approved weather-resistive sheathing paper.

The City will perform a water barrier inspection as well as a sheathing inspection. The water barrier inspection will be performed as part of the framing inspection. This will mean that the sheathing inspection is a separate inspection.

### Summary of Significant Changes to 2009 IECC for Residential (Does not include R-1 occupancies)

This is a comprehensive listing of the significant changes as they apply to the 2009 International Energy Conservation Code. This overview is not to be considered an all-inclusive listing of all the changes that can be found in the 2009 IECC.

- Permanent energy certificate shall be posted on the electrical panel. *The only change is that the certificate cannot obstruct the panel label or any manufacturer nomenclature.*
- U-factors and SHGC have increased. *2009 IECC now requires a U-Factor of .50, and a solar heat gain coefficient of .30.*
- Attic access opening or attic doors are required to be insulated and weather stripped.
- Building thermal envelope air leakage now includes an option for blower testing and an option for visual inspections to be performed to ensure air sealing compliance. *Each one of the options has specific testing criteria that must be followed. For further information see section 402.4.2 through 402.5 and table 402.4.2 of the 2009 IECC. All forms should indicate whether the test was completed during construction or post construction.*
- All new wood burning fireplaces shall have outdoor combustion air and doors with gasket seals.
- All recessed lighting shall be IC rated and sealed to prevent air leakage. *This requirement applies only to all recessed lighting that penetrates the conditioned space envelope.*
- At a minimum, 50% of the lamps in permanently installed lighting fixtures shall be high efficiency.
- Forced air furnaces now require a minimum of one programmable thermostat.

- Sealing of all duct work is mandatory and shall be tested to ensure minimal leakage is achieved. *Duct tightness can be verified at post construction or during rough-in. Each test method has a set of test criteria that must be met for compliance. All forms should indicate whether the test was completed during construction or post construction.*

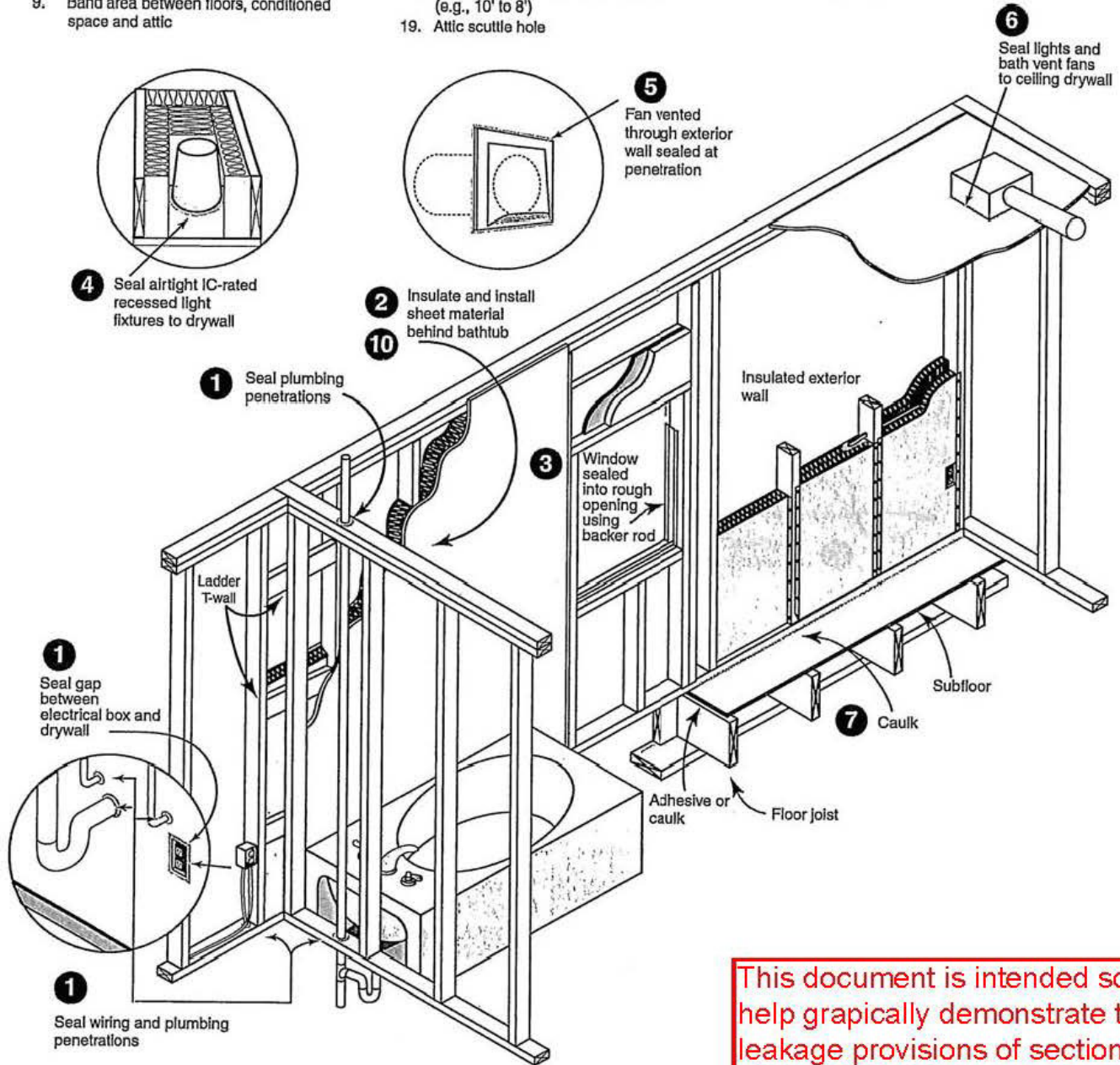
*Information can be found by reviewing sections 403.2.2(1) and (2) of the 2009 IECC. If all HVAC equipment and duct work is located in a conditioned space, duct tightness testing is omitted.*

- Existing HVAC systems that are changed/upgraded to include replacing all duct work shall be required to meet the test requirements listed above.
- If you have a multi-tenant building where one HVAC system is supplying more than one dwelling, the system shall be designed using the criteria found in sections 503 and 504 of the commercial section of the 2009 IECC.
- Heated pools now have mandatory requirements for energy conservation.
  - 1) *Readily accessible on/off switch that allows shutting off the heater without adjusting the thermostat.*
  - 2) *Gas pool heaters shall not have continuous burning pilot lights.*
  - 3) *Pool heaters and pumps shall be equipped with time switches that turn on and off equipment according to preset schedules. This does not apply where public health standards require 24 hour pump operation, or for solar and waste heat recovery pool heating systems.*
  - 4) *Pool covers are required. If the water temperature is greater than 90 degrees Fahrenheit a pool cover with a minimum insulation R-value of R-12 shall be installed. This does not apply where 60% of the energy for heating is derived from solar or a site recovery system.*

**Note:** In July of 2013 with the adoption of the 2012 International Codes it will become a city requirement to submit Manual "S" when submitting HVAC load calculation data sheets. To clarify manual "J", "D" and "S" will be required at the time of plan submittal for all new residential projects beginning **July 1, 2013.**

# Air sealing key points

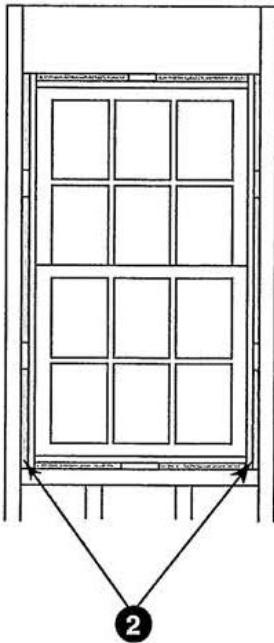
1. Building envelope plate and wall plumbing and electrical penetrations
2. Tub/shower on outside or attic wall
3. Window and door rough openings
4. Airtight, IC-rated recessed lights and electrical fixtures exposed to attic
5. Exterior wall exhaust fan terminations
6. Ceiling mounted bath fans, speakers, etc.
7. Bottom plate and top plate
8. Seams between rigid exterior sheathing
9. Band area between floors, conditioned space and attic
10. Tub on exterior wall
11. Mechanical equipment and ductwork chases in attics, crawlspaces
12. Ceiling/crawlspace electrical boxes
13. Ceiling/crawlspace HVAC boots
14. Shower and tub drain line
15. Fireplace inserts
16. Attic kneewall doors
17. Joist cavities under attic kneewall's
18. Transition between ceiling heights (e.g., 10' to 8')
19. Attic scuttle hole
20. Attic pull-down stairs
21. Wall penetrations of mechanical combustion closets
22. Thresholds at mechanical combustion closet doors
23. Band joist exposed to exterior
24. Band area exposed to unconditioned space (such as basement or garage)
25. Exterior wall penetrations for refrigeration lines, condensate line, etc.



This document is intended solely to help graphically demonstrate the air leakage provisions of section 402.4 of the 2009 IECC. It does not cover all airsealing locations or techniques. Other code provisions may be applicable as well.

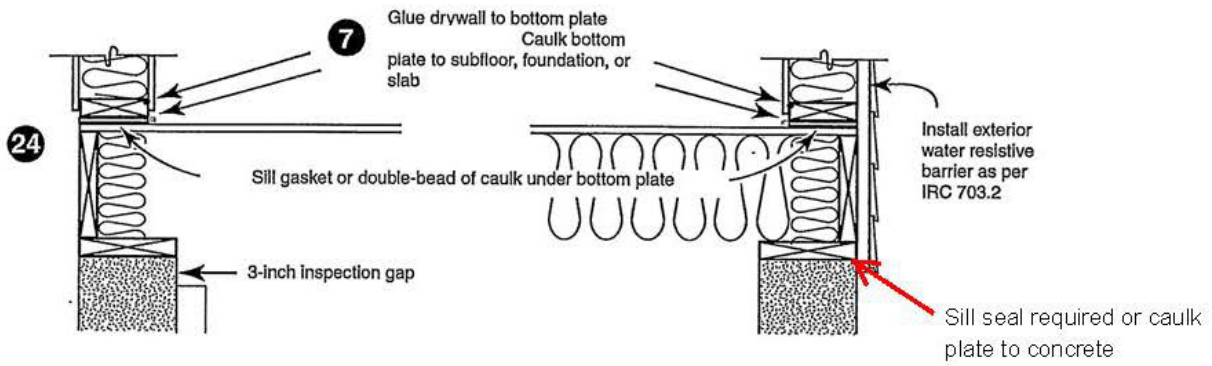
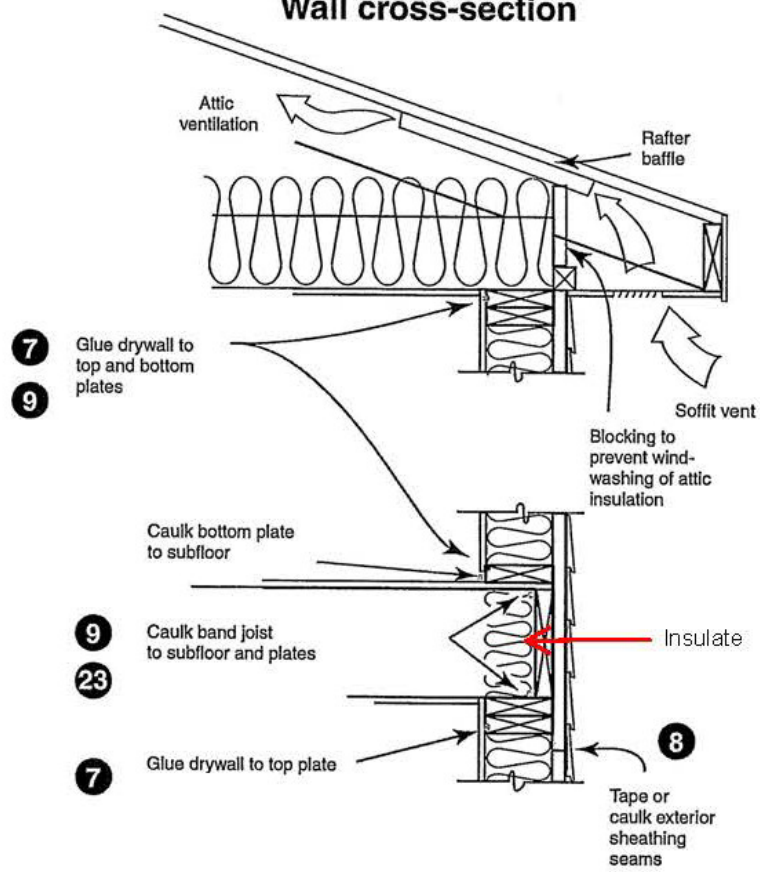
# Air sealing key points *continued*

## Window rough opening



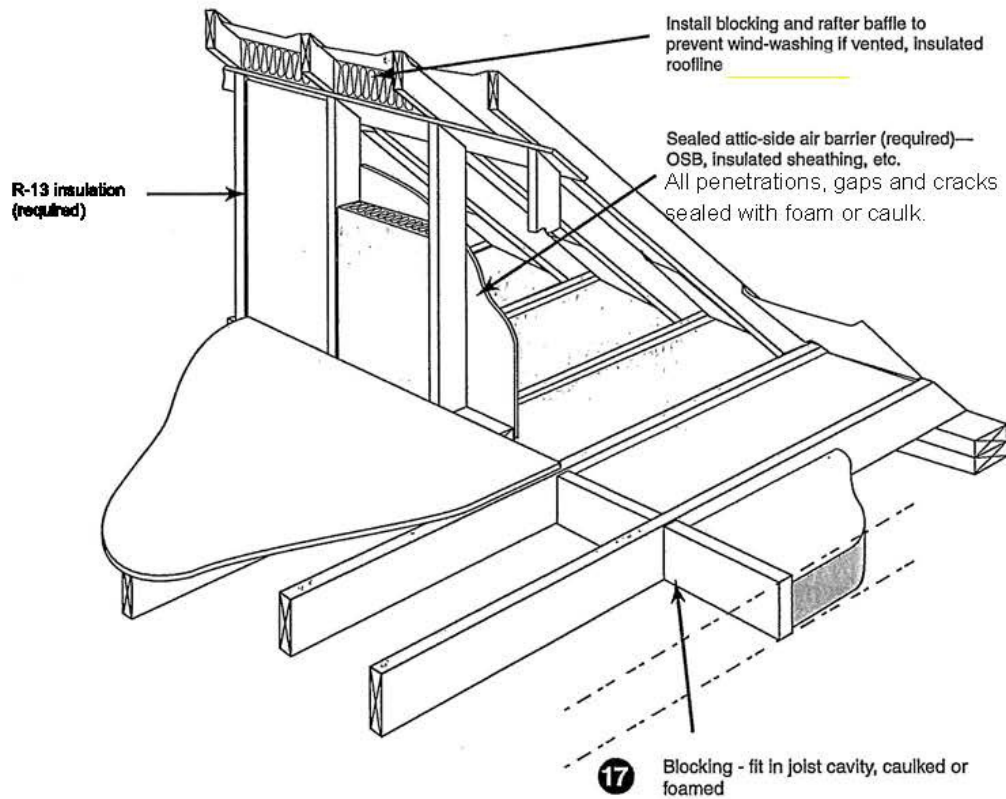
Use backer rod or spray foam (appropriate for windows) to fill gaps between window/door and rough opening

## Wall cross-section

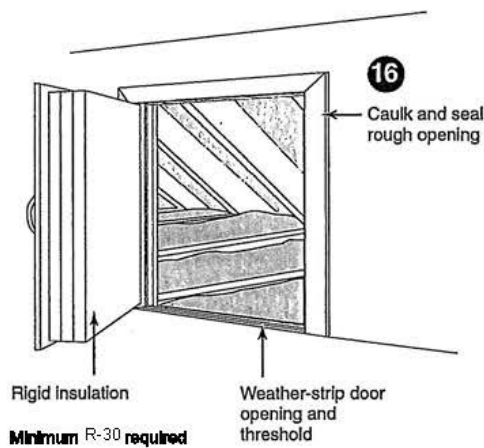


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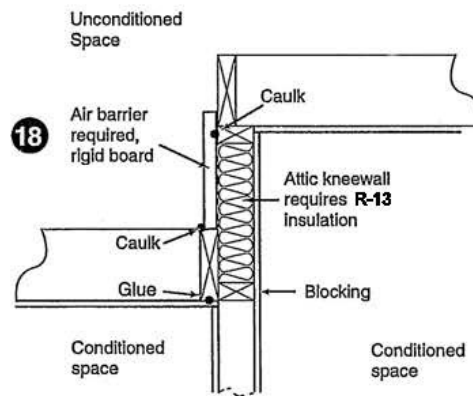
## Air sealing key points *continued*



### Attic knee-walls

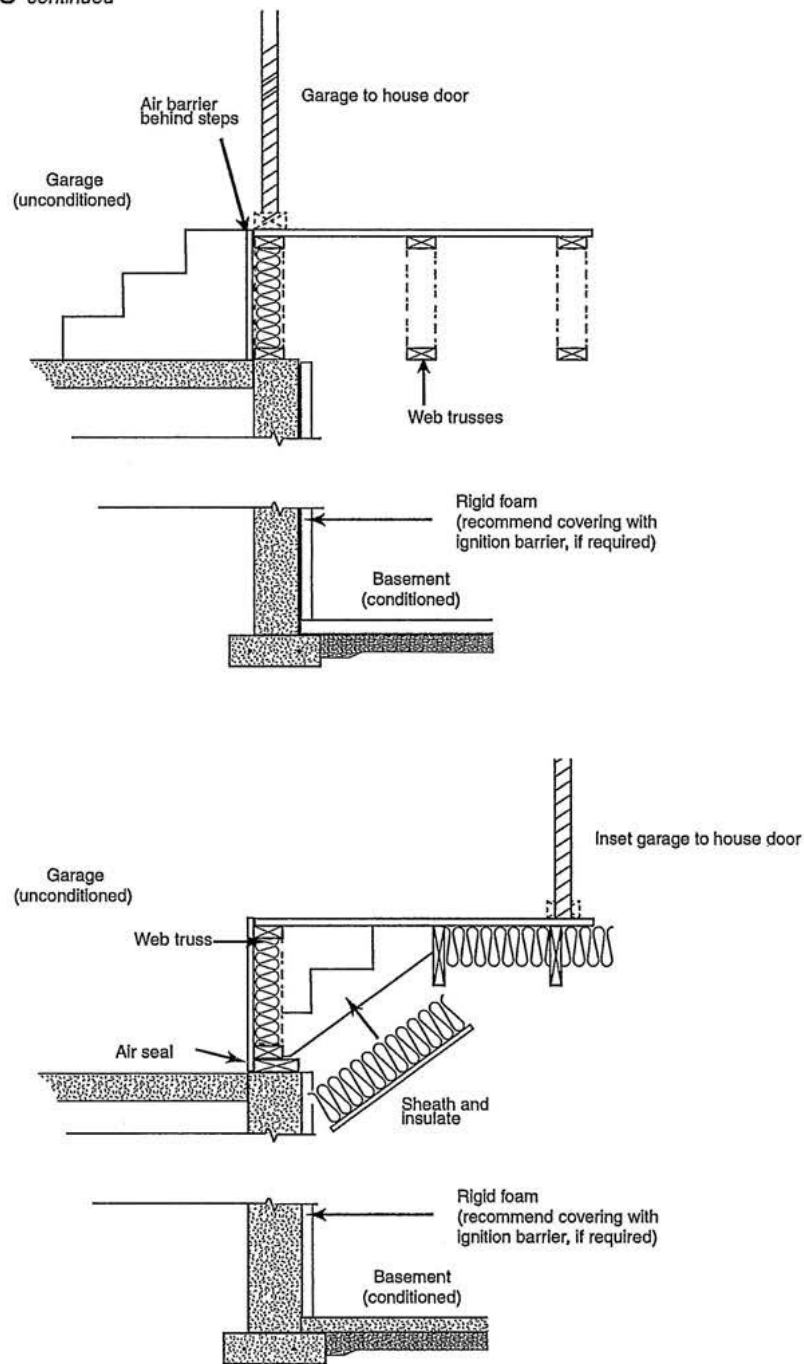


### Two-level attic



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## Air sealing key points *continued*



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**Building Thermal Envelope Air Leakage Compliance Certificate**

**Project Address:** \_\_\_\_\_ **Permit No.** \_\_\_\_\_

Initial	Component	Criteria
	Air barrier and thermal barrier	Exterior thermal envelope insulation for framed walls is installed in substantial contact and continuous alignment with building envelope air barrier. Breaks or joints in the air barrier are filled or repaired. Air-permeable insulation is not used as a sealing material. Air-permeable insulation is inside of an air barrier.
	Ceiling/attic	Air barrier in any dropped ceiling/soffit is substantially aligned with insulation and any gaps are sealed. Attic access (except unvented attics), knee wall door, drop down stair is sealed. Drop down stair insulation blankets shall be R-30.
	Walls	Corners and headers are insulated. Junction of foundation and sill plate is sealed.
	Windows and doors	Space between window/door jambs and framing is sealed.
	Rim Joists	Rim joists are insulated and include an air barrier.
	Floors (including above-garage and cantilevered floors)	Insulation is installed to maintain permanent contact with underside of subfloor decking. Air barrier is installed at any exposed edge of insulation.
	Shafts and penetrations	Duct shafts, utility penetrations, knee walls and flue shafts openings to exterior or unconditioned spaces are sealed.
	Narrow cavities	Batts in narrow cavities are cut to fit, or narrow cavities are filled by spray/blown insulation.
	Garage separation	Air sealing is provided between the garage and conditioned spaces.
	Recessed lighting	Recessed light fixtures are air tight, IC rated and sealed to drywall. Exception: fixtures in conditioned spaces.
	Plumbing and wiring	Insulation is placed between outside and pipes. Batt insulation is cut to fit around wiring and plumbing, or sprayed/blown insulation extends behind piping and wiring.
	Shower/tub on exterior wall	Showers and tubs on exterior walls have insulation and air barrier separating them from the exterior wall.
	Electrical/phone box on exterior wall.	Air barrier extends behind boxes or air-sealed boxes are installed.
	Common wall	Air barrier is installed in common wall between dwelling units.
	Crawl space walls	Insulation is permanently attached to walls. Exposed earth in unvented crawl spaces is covered with Class I vapor retarder with overlapping joints taped.
	HVAC register boots	HVAC register boots that penetrate bldg. envelope are sealed to subfloor or drywall.
	Fireplace	Fireplace walls include an air barrier. Fireplaces have tight fitting flue dampers and combustion air.

**By signing and initialing this document you are affirming that this structure is in full compliance with the 2009 International Energy Conservation Code to include sections 402.4, 402.4.3 and table 402.4.2.**

**Date:** \_\_\_\_\_

**Signature:** \_\_\_\_\_

**Please Print Name:** \_\_\_\_\_

**Company Name:** \_\_\_\_\_