

“Top 10 List”

Of

IECC, IRC 2009 & 3rd Party RESNET inspection areas of concern

This is a list summarizing our company’s experiences in inspection, testing, and verifying of past projects that have been intended to meet code or exceed code and have had great difficulties in doing so. We have found that inspection quality performed by code officials and by the third party raters varies greatly. These “Top Ten” items if addressed, assist in making a project more likely to meet code and manufacturer installation requirements. These construction practice improvements are critical now more than every as the IECC 2009 and IRC 2009 and some local above code programs are now requiring higher standards to be met and in some cases inspection by third party companies.

1. **DUCTWORK SEALING IECC 2009 –**

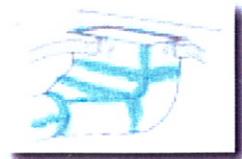
Section 403.2.2 Sealing. All ductwork, air handlers, filter boxes... shall be sealed.

Inspectors need to verify the UL approval label on the tape or the mastic for the application. The contractor shall be informed

that per IECC 2009 Section 403.2 that Ductblaster testing will now be required and is harder to pass than one thinks for the first timer. Better sealed duct work actually helps with the Blower Door testing results as well and the ductwork is connected to the thermal envelope in most cases/projects. Another aspect to consider is the difficulty of sealing floor and wall cavities on return air systems to meet the required leakage test rates.

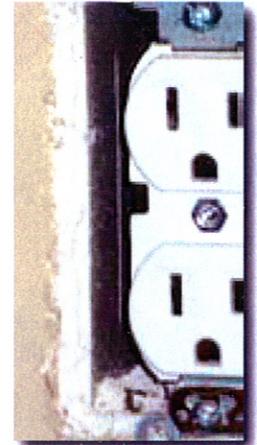
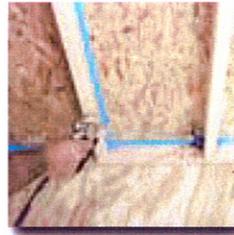


2. **SEAL DUCT BOOT FLOOR PENETRATIONS –** If this penetration location occurs at the thermal boundary this shall be sealed, this condition if not sealed in any installation will contribute to the likelihood of poorer blower door testing results and the introduction of poor indoor air quality IAQ into living space above.

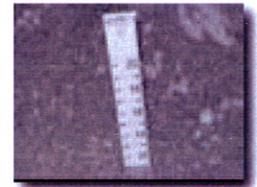


3. **AIR LEAKAGE IECC 2009 -SEAL ALL PENETRATIONS –** Section 402.1.1 Building Thermal Envelope. The building envelope shall be durable sealed. All plumbing/electrical penetrations, joints at interior walls, and exterior walls shall have any vertical or horizontal penetrations caulked or foam sealed where said components are able to communicate with the

thermal boundary of the home. If the floor penetrations to walls above are not sealed, then the blower door results will communicate with walls above and potentially into attic space- leading to overall poor blower door results. It is not uncommon to not seal with foam the wiring entering outlet “J” boxes, lateral wiring, plumbing penetrations at studs, caulking of the ”J” box to the drywall cut out, or the installation of foam gasket covers behind the cover plates. These problematic areas will lead to poor blower door results if not sealed properly. With a mechanically ventilated crawlspace; this area is added to the thermal envelope therefore no crawlspace vents allowed and the rim and band shall be caulked/ sealed and insulated. If this condition is not well sealed and the plate does not have sill seal foam strip, poor blower door results will ensue. This space is directly connected to the home above with the transfer grill per code.



4. **INSULATION DEPTH-** The code does not clearly specify a continuous or a average R-value for roof insulation. I find that this means that at attic can lights, attic ductwork, bath fans etc. that these locations shall have depth markers placed directly adjacent to allow inspector to confirm the mounding of insulation for a continuous R-Value. We know from the use of infrared and smoke puffer observations equipment that if insulation is installed at a level application(Average R-Value) there is greater air loss/infiltration or heatloss if not installed as noted above.



5. **MANUFACTURERS INSTALLATION**

REQUIREMENTS FOR INSULATION- Example “A”.

Too often insulation products are being installed in applications/locations such that when investigated the manuf. requirements are not met or the specific application/installation is entirely not approvable based on not having complied with manuf. specs/details, ICC, or ICBO reports. An example is the use of blown on/in cellulose or fiberglass onto concrete stem walls. Upon contacting the three largest fiberglass



manufactures (Owens Corning, Knauf, & CertainTeed), their respective institute, and(1) cellulose manuf. and their institute; there appears to be no support for this typical installation. I could not approved.

MANUFACTURERS INSTALLATION REQUIREMENTS FOR

ATTIC INSULATION- Example “B”. An example is the use of 24” fiberglass batts to lay on a flat ceiling attic. This installation actually requires (2) layers of insulation - one layer placed on the truss bottom chord parallel to truss bay and the second in a perpendicular fashion to achieve the required depth. This is based on meeting the manuf. grade 1



installation requirements.

IRC 2009 Section R106.1.2 Manufacturer's Installation Instruction. Manufacturers installation instructions shall be available on the job site at the time of inspections.

6. INSULATION OF ALL HOT WATER PIPING - DOMESTIC HOT WATER OR RADIANT SUPPLY / RETURN LINES.

IECC 2009 Section 403.3 Mechanical system piping insulation. Mechanical system piping capable of carrying fluids above 105° shall be insulated.



7. INSULATION INSTALLATION TO GRADE ONE REQUIREMENTS-

RESNET and manuf. requirements. No insulation shall have gaps greater than 1/8", batts shall not be compressed, batts shall be cut around wiring/ plumbing and cavity shall be fully filled. Attic access/ crawlspace access at thermal boundary shall be insulated and air sealed and R-Value to match adjacent attic and be securely attached to access lid per IECC section 402.2.3



8. INSULATION INSTALLATION AT KNEE WALLS AND END WALLS OF VAULTED SPACES TO ATTICS BEYOND. It is very common that a bonus room's knee wall or vaulted walls to attics beyond are not treated as exterior walls. Grade 1 installation requirements require (6) sided encapsulation of insulation, this means this wall shall be built just like an exterior wall with: dry wall, vapor barrier, insulation, plywood, hard surface, etc.



9. FOAMING OF R.O.'s AT WINDOWS AND DOORS. These gaps shall be foam filled full depth to maximize R-value to match walls. It is not uncommon to see fiberglass inserted or 1" of foam.

10. INSULATED AND SEALED CAN LIGHTS - The code clearly states the use of sealed and insulated rated can lights or air tight trim kits. This is still being missed regularly and will lead to failing blower door results. IECC 2009 Section 402.4.5 Recessed Lighting – Recessed luminaries shall be sealed to limit air leakage and shall be IC- Rated.



Bonus

11 VAPOR BARRIER – IRC 2009 Section R601.3 Vapor Retarders. A vapor retarder is required in climate zone 6. The only exception is if: Construction where moisture or its freezing will not damage materials. This likely does not apply in our climate zone due to freezing of moisture will make most insulation not perform.

Additional Code thoughts to consider:

1. Inspections shall include the code required spacing of the insulation depth markers per IECC 2009 Section 303.1.1.1 Blown or Sprayed roof/ ceiling insulation.
2. Please verify the ventilation calculations for eave and roof venting and have applicant account for the loss or area of the screen or the vents themselves. This ventable loss area leads to a deduction of effective area and can be up to 40% of ventable area. The issue is that as verifiers we inspect projects that do not meet the building codes criteria and are suffering ice damming, and overheating in the summer, or long-term structural/ material water intrusion damage. IRC 2009 Section R806.2 outlines the required formulae.
3. Please verify calculations for the crawlspace mechanical ventilation fan. More ventilation cfm is not better in this situation in that too much cfm creates a negative pressure in the home that can cause backdrafting of appliances, and lead to great energy loss due to infiltration. IRC 2009 Section R408.3 Unvented crawlspace outlines the required formulae.. This area/ volume shall also be included in the Manual "J" heat loss analysis for FAU sizing as it adds conditioned space volume to the home.
4. Bathroom fans when actually tested almost never meet the ASHRAE standards of 50 cfm for intermittent flow rates. Have a dialogue with the applicant to size fan CFM based on length of duct run, type of ducting etc.,. Manufacturers of fans will readily provide this information to customers. Suggest hard ducting over corrugated.
5. If mechanical systems are outside of the conditioned space then the duct boots shall also be insulated to the R -Value requirement of the code.

Credits.

1. Duct Mastic photo www.energycodes.gov
2. Duct Blaster photo- Vital SPEC inc
3. Duct boot sealing photo – www.Oikos.com
4. Wall sealing photo – www.knaufusa.com
5. Outlet sealing photo – www.energywatcher.com
6. Insulation depth marker photo – www.epa.gov
7. Fiberglass blown on photo – Vital SPEC inc
8. Fiberglass batt install photo – www.owenscorning.com
9. Pipe insulation photo -www.longbeachplumber.com
10. Insulation at outlet photo- energy star critical details
11. (6) sided insulation encapsulation photo- energy star critical details
12. Airtite can light photo- Vital SPEC inc