**Blue Line Inspection Services** Dallas - Tulsa

P.O. Box 867117 Plano Texas 75086-7117
972.567.8679 Fax: 972.618.1903

Thank you for selecting Blue-Line Inspections to perform the 2000 IECC energy review for your proposed project. We have provided this guide for you to help you understand some of the inspection requirements for the IECC. Included in this packet is information we feel will help to expedite your inspection process. Pease read this information prior to commencing work and call Garrett Prosser at 972-567-8679 if you have any questions.

This packet will accompany the RES*Check*™ review information, and the stamped and approved plans - **KEEP THE ORIGINAL PLANS, THEY ARE YOURS AND WILL BE REQUIRED FOR ALL INSPECTIONS**. Copies of the RES*Check*™ review may be required by the permitting jurisdiction for permitting and records- the stamped and approved plans are not required. Please note the permitting office may not return the originals to you, so make copies as necessary.

A minimum of two inspections will be required to verify compliance with the *IECC*:

1. The first inspection is the *Insulation Inspection* performed prior to the brick and drywall being installed. This can be broken into two inspections: one to inspect the exterior sheathing prior to brickwork, and a second after insulating the interior.
2. The second inspection is the Final Inspection performed near completion of the residence, prior to your Final or C.O. Inspection

Request for inspections should be made a minimum of 24 hours notice, in order to reserve an inspection time for your project.

The stamped and approved plans, the RES*Check*™ review, and this packet must be placed on the jobsite for inspection. It should be placed inside the front door in a conspicuous place for use during the course of the above referenced inspections. It is the responsibility of the contractor to maintain the report in a clean, dry, safe location.

It has been our pleasure to perform this work for you. If we can be of any further assistance, please do not hesitate to contact us.

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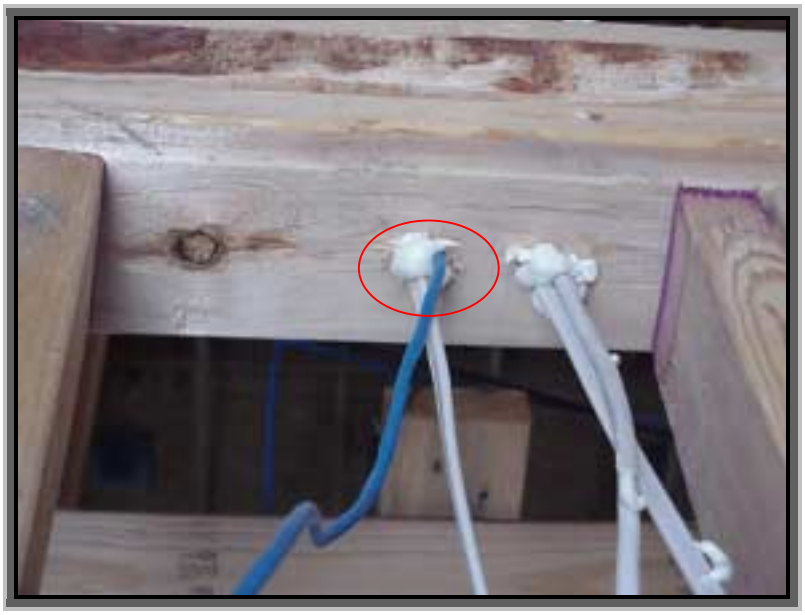
# INSULATION INSPECTION

## SHEATHING / AIR SEALING

There is no specific code language that dictates exactly how an air leak should be sealed or the quality of the seal. However, all penetrations in the building envelope between conditioned and unconditioned space or outside the building must be sealed with durable caulking materials or closed with gasket materials *(IECC Section 502.1.4.2 and 602.1.10)*. This includes but is not limited to: light boxes, can lights, plumbing and gas lines, switch and outlet boxes, and vents. The code also allows the use of vapor-permeable house-wrap as an air barrier be used to seal air leaks. Joints and penetrations should be taped.

There are several types of material that can be used to seal air leaks. They include durable caulking materials, foam backer rod, expanding foam products, and other foam products. Fiberglass batt insulation is not an effective air sealant.

Caulking and weather-stripping must be installed in accordance with the manufacturers instructions.



**Top plate penetrations properly sealed**

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## INSULATION

It is important to inspect the insulation prior to covering it with sheetrock to ensure that it as been installed properly and that it has the correct R-value.

First, the right level of insulation should be installed. Second, it must be installed correctly.

Inspection will verify the following:

- ✓ Wall insulation R-values and installation
- ✓ Floor insulation R-values and installation
- ✓ Cathedral ceiling insulation R-value and installation
- ✓ A vapor retarder for unvented walls, floors, and roof assembles, is installed

WALLS

All walls between conditioned spaces and the outside or any and all unconditioned spaces must be insulated *(IECC Section 502.2.1.1, 502.2.4.1 and 602.1.1*).

This includes:

- ✓ Exterior walls
- ✓ Knee walls in attics
- ✓ Perimeter joists
- ✓ Wall(s) between the house and the garage

The installed insulation R-value must meet or exceed the R-value called out on the plans and / or documentation. Insulation R-values must be marked on the insulation with an R-value designation. Insulation should fill the cavity and extend from top plate to bottom plate. Insulation should also be placed behind and around all plumbing and electrical boxes. All penetrations in exterior sheathing should be repaired as noted above.

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CEILING

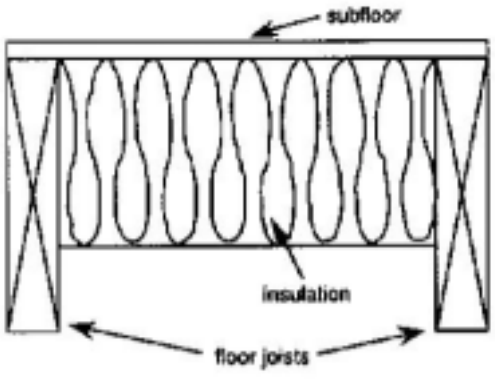
Typically fiberglass batt insulation is installed in these assemblies. The installed insulation R-value must match or exceed the specified R-value on the approved plans / specifications. Insulation R-values must be marked on the insulation with an R-value designation. The insulation should fill the entire ceiling joist cavity and extend down over the top of the exterior walls. The insulation must not block vent openings in the eaves and must have a minimum 1-inch space between the insulation and the roof sheathing at the location of the vent *(IRC Section R806.3*).

Baffles should be installed at all the eave and soffit openings. The baffles should be installed up and over the insulation and above the blown-in attic insulation to prevent 'wind-washing'. (see also Page 11)

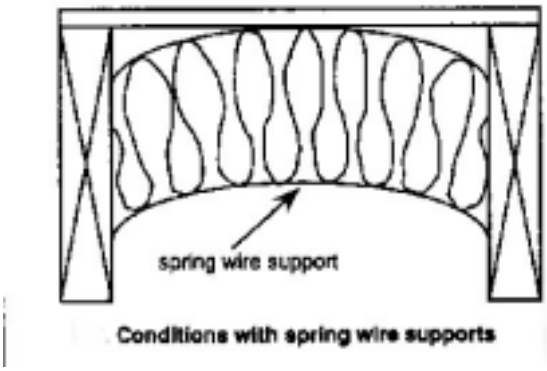
FLOORS

Floors over garages and or porches and overhangs must also be insulated. The installed insulation R-value must match or exceed the specified R-value on the approved plans / specifications. *(IECC Section 502.2.1.3, 502.2.4.8 and 602.1.4*). Insulation R-values must be marked on the insulation with an R-value designation. Vapor retarders are only required in unvented floor spaces and must have a perm rating of 1.0 or less.

Properly installed floor insulation should be **flush** against the sub floor, with the **vapor retarder** (where required) **against the sub floor**. The insulation should not sag away from the floor. The insulation should be adequately and uniformly **held by supports** such as furring running perpendicular to the joists, piano wire stapled to the joists, or "tiger teeth." Supports should be placed a maximum of 24" o.c. and should not compress the insulation more than 1". Where the insulation is to be covered with soffits or paneling, the insulation must be inspected prior to covering.




**Ideal insulation install.**




**Typical install with tiger teeth.**

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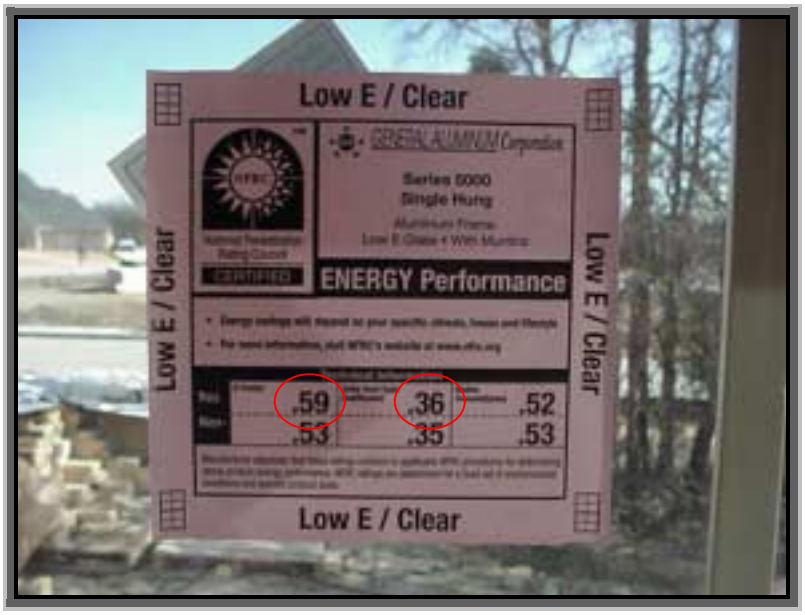
## WINDOWS

Three key elements will be inspected:

1) Glazing area (window and door areas match approved plans)
2) Glazing U-factor
3) Solar Heat Gain Coefficient (SHGC)

The U-factor is a measure of the efficiency of the window. The lower the U-factor the greater the efficiency. The code requires windows, glass doors, and skylights to also be rated by the *National Fenestration Rating Council* and have labels that contain the rated U-factor for the glazing unit *(IECC Section 102.5.2*). **The labels must be in place for the inspection.** The installed window or door unit must meet the U-factor requirement called out on the plans and / or documentation. If the U-factor is less than or equal to what is on the plans / documentation, the window complies.




**NFRC Label specifying U-Factor and SHGC of window**

The Code require glazing to have an average solar heat gain coefficient (SHGC) of 0.40 or less *(IECC Section 502.1.5*)

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## HVAC

The code also requires that the R-value be printed on the duct insulation every 10 feet, so it should be easy to compare the installed duct insulation R-value with what is shown on the plans / specifications. Please note the *International Mechanical Code* (IMC) and *International Residential Code* (IRC) specifies that ducts must be labeled every 3 feet. If the jurisdiction has adopted either of these codes *in addition* to the IECC, the IRC or IMC requirement would take precedence over the IECC.

Ducts in conditioned and unconditioned spaces, including outside the building envelope, are required to be sealed. Supply and return ducts are required to be sealed with:

- ✓ Welds
- ✓ Gaskets
- ✓ Mastics
- ✓ Mastic-plus-embedded-fabric systems
- ✓ Approved tapes

**Duct tape, or any other unapproved tape, is not permitted as a sealant on any ducts**. (*IECC Sect 503.3.3.4.3)*

**Mastic correctly installed at return air duct connection in wall**

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HVAC PLUMBING INSULATION

Please refer to Table 503.3.3.1 for the requirements for insulating HVAC plumbing. Note that the insulation thickness must be increased by ½ inch for all pipe exposed to outside air.

## RECESSED CAN LIGHTS

The Code allows two options for can lights installed in the building envelope:

1) The can lights must either be Type IC rated or have a sealed box installed over the top of the fixture with at least 3 inches of clearance from insulation. The IC rating is visible on the inside of the installed can light. IC stands for "insulation contact," so an IC rating means the fixture is safe to be in contact with insulation. If a sealed box is used to meet the requirements, all electrical wire penetrations in the box should be sealed. In addition, the box should be sealed to the attic floor.

2) The can lights must be air tight to reduce air movement and associated energy loss. The fixtures must either pass the ASTM E 283 test for air leakage or must be manufactured with no penetrations between the inside of the recessed fixture ceiling cavity, and sealed or gasketed to prevent air leakage into the unconditioned space. A recessed can light installed inside a sealed box will also meet the requirements of the code. Look for labels on the fixtures that designate the fixtures as sealed or air tight


**Properly labeled recessed can light with Gasket installed.**

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# FINAL INSPECTION

## ATTIC INSULATION

ROOF AND CEILING INSULATION

Either fiberglass batt or 'blow-in' insulation may be used to insulate the roof / ceiling.

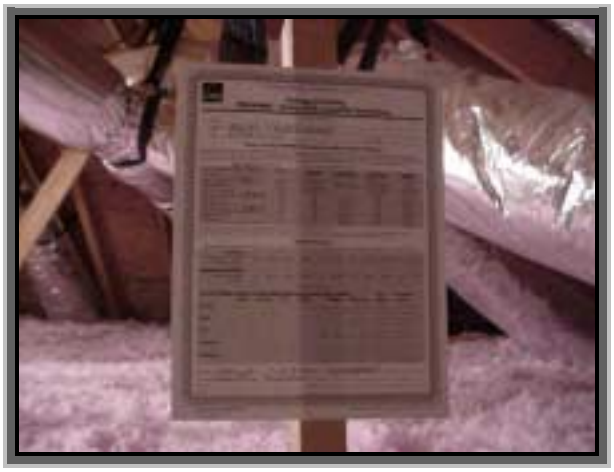
a) Batt Insulation
If fiberglass batt insulation is used in the attic, the insulation level marked on the face of the batts must meet or exceed the value given on the plans / documentation. The IECC requires both faced and unfaced batts to be marked with the R-value. The fiberglass batts should extend over the top plate of the exterior walls and there should be no gaps in the insulation.

b) Blown-In Insulation
*IECC Section 102.5.1.1* requires an attic insulation certification to be affixed to the structure near the attic access opening. This certification must include the following:

- ✓ R-value of the installed thickness
- ✓ Initial installed thickness
- ✓ Settled thickness
- ✓ Coverage area
- ✓ Number of bags installed

The R-value on the certification must meet or exceed the R-value specified on the plans / documentation. Insulation thickness markers, with 1" numbers, are required to be spaced throughout the attic no less the one per every 300 square feet. The blown insulation should be installed uniformly and extend over the top plates of all exterior walls.

**Installation certificate not secured to the structure.**



**Installation certificate correctly installed.**

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Baffles should be installed at all the eave and soffit openings. The baffles should be installed up and over the insulation and above the blown-in attic insulation to prevent 'wind-washing'.

Depth Gauge correctly installed

Baffles installed above insulation

## CIRCULATING HOT WATER SYSTEMS

Circulating hot water systems must have manual or automatic controls that allow pumps to be conveniently turned off when the system is not in operation. If the pump is conveniently located in a garage the on/off switch may be located on or near the pump. If the pump is located in an inaccessible location, the control must be located in a more convenient location.

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## HEAT TRAPS ON WATER HEATERS

Water heaters are a major energy user in residential buildings. The IECC requires heat traps be installed unless the water heater is part of a circulating system. (*IECC Section 504.7 and 604.1)* A heat trap is a device or an arrangement of piping that keeps buoyant hot water from circulating through a piping distribution system through natural convection. These may be installed by the manufacture, as an aftermarket add-on, or site- fabricated in the supply piping. If the heat trap in manufacture installed, the manufactures literature must be on site near the water heater to verify, otherwise an add-on or site built heat trap will be required.

Piping for water heaters must be insulated per table 504.5. Note a minimum 1/2" wall insulation is required on all hot water piping.

**Insulation missing; insulation not correct thickness.**

## HEAT PUMP THERMOSTATS

Heat pumps require a special heat pump thermostat that prevents supplementary electric resistance heat from coming on when the heat pump can handle the load (*IECC Section 503.2.3)*

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## HEATING AND COOLING EQUIPMENT AND DUCTWORK

All heating and cooling systems must have:

1. Thermostat to control the temperature and turn the system on and off
2. Identifying labels with the equipments AFUE and / or SEER value affixed to the equipment in order to verify their compliance with the code.
3. Manufactures installation and specification guide.

HVAC Equipment size and ratings must meet or exceed the ratings specified on the plans / documentation. The equipment energy-rating label must be attached to the unit for the inspection to verify compliance with the minimum requirements. *(IECC Sect 502.3)*

**Incorrect.**

**Correct.**

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DUCTWORK

Ducts in conditioned and unconditioned spaces, including outside the building envelope, are required to be sealed. Supply and return ducts are required to be sealed with:

- ✓ Welds
- ✓ Gaskets
- ✓ Mastics
- ✓ Mastic-plus-embedded-fabric systems
- ✓ Approved tapes

**Duct tape, or any other unapproved tape, is not permitted as a sealant on any ducts**. (*IECC Sect 503.3.3.4.3)*

**Properly applied mastic to ductwork connections.**

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## WEATHER-STRIPPING OF DOORS

All exterior doors, attic access doors, should be sealed with a new, tight fitting weather-strip. Thresholds and sweepers should be adjusted and tight fitting. Attic access pull down stairs should be insulated and weather-stripped. (*IECC Sect. 502.2.1.2)*

**Weather-strip missing on door**

**Attic access not insulated nor weather-stripped.**

## ENVELOPE PENETRATIONS

Envelope penetrations such as electrical outlets, vents, and plumbing must be sealed with caulking, gaskets or bedding material. Random inspections of penetrations, including removing escutcheons and outlet covers, will be made to ensure compliance*. (IECC Sect 502.1.4.2)*

**Envelope penetration not sealed**

**Outlet correctly sealed with durable caulking**