

# **2006 International Energy Conservation Code**

## **Residential Compliance Instructions and Forms**

**Purpose:**

This code was designed to conserve our national resources and to defray ever-increasing energy costs to the home owner. The Federal Department of Energy, the State of Nevada and the jurisdictions throughout the Las Vegas valley have mandated that all new construction meet or exceed the minimum requirements of the 2006 International Energy Conservation Code as of May 1, 2007. In addition, the Las Vegas valley jurisdictions have amended this national code to better suite the circumstances and climatic conditions of our desert southwest local.

Compliance with this code will insure that you will have comfortable, energy efficient living environment.

**How do I comply?**
**What is Required?**

The contractor/owner is required to provide two copies of all construction plans and documents with the application. A Residential Energy Code Synopsis (see Attachment 1) must be filled out in its entirety and scanned onto the cover sheet of the plans adjacent to the building code analysis. Be aware that this synopsis must clearly demonstrate that your project meets the minimum prescriptive requirements of IECC Table 402.1.1 for insulation and fenestration requirements by component and IECC Table 402.1.3 for equivalent U-factors (see these tables below). In all cases the construction plans and details must clearly reflect use of the components and information that is being provided on the worksheets.

**Methods of Compliance: The builder may demonstrate compliance with the 2006 International Energy Conservation Code in one of 4 ways:**

**Method 1:** The simplest way to comply is to use the Simplified Prescriptive Method (see below). This method requires you to meet or exceed the minimum listed values that appear in IECC Tables 402.1.1 and 402.1.3.

**Method 2:** When trying to comply for an entire new home, you may use the Residential Component Performance Method. A complete area measurement for all exterior walls, common walls between the house and garage, all ceilings and rough window and door openings is required. Then you must compute compliance per the attached worksheet. Two copies of the work sheet, clearly demonstrating compliance with the code, are required to be submitted with the plans.

**Method 3. (Recommended for new homes) Use of U.S. Department of Energy's on-line software REScheck:**

The component performance analysis is greatly simplified by utilizing the *REScheck* software available on the DOE web link in lieu of a calculations worksheet. This link is [[www.energycodes.gov](http://www.energycodes.gov)] and is free to all users. In this program, the designer may manipulate or trade off the various building energy components within the wall and roof assemblies in order to provide the most compliant and desirable building envelope. After the desired result is achieved, and the planned assembly is clearly shown to meet or exceed the code standard, the entire report must be printed out and submitted with the plans package, in duplicate, to the building department.

**Method 4. Simulated Performance Alternative per IECC Sec. 404: (This approach must be calculated and prepared by your design professional.)**

The section establishes criteria for compliance using simulated energy performance analysis software, usually used by professional energy experts, mechanical engineering firms and some architects. Such analysis shall include heating, cooling, and service water heating energy only. Compliance with this section of the code requires that the criteria established in amended IECC Sections 401, 402.4, 402.5 be met. ( See the Building IECC Code Requirements section on the Energy Code Synopsis sheet.)

The software developed for our valley is designed to compare energy sources based on source energy used at the site where 1kWh+10,239 Btus. The approved software for our valley are Remrate and Micropas v7.3.

**You should discuss the required energy compliance alternatives with your design professional or mechanical contractor.**

### Definitions

**The following are terms that you should become familiar with:**

**Approved Material:** Any material specifically listed in the building code or that is approved by the code jurisdiction in which you live that has authority to require the building permit. The persons having authority in your jurisdiction with regards to approving materials are the building department plans examiners and the field building inspectors.

**Air Barrier:** A component of the thermal energy envelope comprised of approved solid opaque materials that supports in-contact insulating materials on one side and is sealed to prevent any leakage of air through the building enclosure. The air barrier can be comprised of, but not limited to, the exterior siding exterior lath and stucco, rigid insulation board, exterior sheathing and sub-sheathing water proof substrate with tiles, masonry, or stone veneers, roof sheathing and drywall between conditioned and unconditioned attic spaces.

**Building Thermal Energy Envelope:** The basement walls, exterior walls, floor, roof and any other building element comprised of a solid air barrier and approved insulation components in substantial, direct contact with it, that encloses or separates conditioned space from any exempt or unconditioned space or outside air.

**Fenestration Components:** Fenestrations are skylights, roof windows, vertical wall windows (both fixed and openable), opaque (solid) doors, glazed doors, glazed block, and combination opaque/glazed doors.

**Fenestration Area:** When calculating the fenestration openings, you should be using the rough openings that the fenestrations fit into, which basically include the window glass and the frames.

**Mass Wall:** Walls constructed of concrete block (CMU), concrete, insulated concrete forms (ICF), masonry cavity, brick (other than brick veneer), earth (adobe, rammed earth, compressed earth blocks, or solid timber /logs.

**R-Value:** The measurement of the rate of time it takes for heat to flow through a material to an area of cooler temperature.

**SHGC (Solar Heat Gain Coefficient).** The ratio of the solar heat gain entering the space through the window assembly to the solar heat radiation generated by the sun on the exterior side of the window. Solar heat gain includes directly transmitted solar heat and absorbed solar radiation which is then reradiated, conducted or convected into the space. (The lower the SHGC the less radiated sunlight will be allowed in to heat the interior of a room). Heat moves to cold. If the radiating temperature on the exterior side of the window is allowed to enter through the window glass without “blocking” it, it will heat up the interior of the room fairly quickly. Many new window glass products, such as tinted windows or low-E glass block the rays of the sun from entering into the room to heat up the space. For example, if the sun is shining on a window and the window only allows in half of the radiating heat from the sun into the room, it is said to have an SHGC of 0.5.

**U-value:** The inverse measurement of the R-Value. It is just another form of measurement of the rate of time it takes for heat to flow through a material to a cooler surface. The fenestration components are usually measured in terms of U-Value, where insulation products are usually stated in R-Values.

**In addition to the above, you should familiarize yourself with the 2006 IECC Code Requirements Checklist that is provided on the attached synopsis sheet.**

### Simplified Prescriptive Method

This is the simplest way to demonstrate compliance with the 2006 IECC for your project. This approach is geared toward owner-builders or small contractors for room additions projects. In this approach, all the building components must merely meet or exceed the minimum requirements of the following tables.

**IECC Table 402.1.1  
Insulation and Fenestration Requirements by Component**

1	2	3	4	5	6	7	8	9	10	11
Climate Zone	Fenestration U-Factor	Skylight U-Factor	Maximum Glazed Fenestration SHGC	Ceiling R-Value	Wood Framed Walls R-Value	Mass Wall R-Value	Floor R-Value	Basement Wall R-Value	Slab R-Value	Crawl Space Wall R-Value
3	0.65	0.65	0.40	30	13	5	19	0	0	5/13
<b>Equivalent U-factors per Table 402.1.3</b>										
3	0.65	0.65		0.035	0.082	0.141	0.047	0.360	0	0.136

#### Explaining the Tables

**Column 1.** The Las Vegas valley is in the desert southwest zone, IECC Zone 3.

**Column 2.** The maximum U-factor that is allowed for Region 3. Windows and glazed doors are required to have a National Fenestration Rating Council authorized sticker affixed to each window. This label states the U-Value and SHGC rating for the window and the window air leakage rate. These labels must remain on the window until building final. Values less than or equal to those listed in the tables are acceptable.

**Column 3.** The maximum allowable U-Value of the skylight. See the NFC label on the unit.

**Column 4.** The maximum allowable solar radiation coefficient of the window. See the NFC label.

**Column 5.** The minimum R-Value rating of the insulation for your attic. The insulation may be installed between the ceiling joists or bottom chord of the roof trusses, or it may be affixed to the underside of, and direct contact with, the roof sheathing. (See manufacturer's installation instructions).

**Column 6.** The minimum R-Value required to be installed in the walls of the conditioned room or space. If more than one type of insulation is being installed the R-Values may be added together to meet the minimum requirements of the table. As an example, if you are using a 1-coat stucco system with 1" polystyrene foam board insulation rated at R2, this may be added to the rated R-Value of the glass fibered insulation being installed within the walls.

**Column 7.** The minimum R-Value of the insulation used on mass walls (see definition above). Note that in order to use this minimum value, at least 50% of the required insulation R-value must be installed on the exterior side of the wall. If not, then the walls must be furred out and the minimum R-value for wood walls must be used on the interior side.

**Column 8.** This column refers to the minimum insulation requirements for floors over crawl spaces or for conditioned rooms that overhang exterior walls or are located over unheated garages. Be aware that the code requires floor insulation to be installed to maintain permanent contact with the underside of the sub-floor decking only.

**Columns 9 and 10.** Since we are in the desert southwest and have no measurable frost depth in winter, insulation is not required on basement walls or at slab edges.

**Column 11.** In very rare instances, houses within the valley are constructed over crawl spaces. When this method is used, insulation may be installed at the exterior crawl space walls in lieu of under the floor decking of the house. When this is planned, the first number in the column, R-5, is the minimum R-value of the insulation if it is being installed continuously on the crawl space foundation wall (interior or exterior side). The second number, R-13, is the minimum insulation rating required if the interior side of the crawl space wall is to be furred out and the batts installed between the studs.

**Fill out the attached IECC Energy Code Synopsis sheet attached and sign. Submit two copies of this document with your plans.**

#### What if my windows are not labeled with NFRC information?

If a builder wishes to re-locate existing windows or has purchased used windows that are not rated, he must attempt to justify the ratings with substantial evidence to the field inspector. This would entail providing a sticker that was originally on the window when installed or would require a manufacturer's or approved testing agency's letter verifying the information required for the unit. If this cannot be done, then default values must be assigned per the following tables.

**IECC Table 102.1.3(1)  
DEFAULT GLAZED FENESTRATION U-FACTOR**

Frame type	Single Pane	Double Pane	Skylight Single Pane	Skylight Double Pane
Metal	1.2	0.8	2.00	1.30
Metal with Thermal Break	1.10	0.65	1.90	1.10
Non-Metal or Metal Clad	0.95	0.55	1.75	1.05
Glazed Block	0.60	0.60	0.60	0.60

**IECC Table 102.1.3(2)**

Door Type	U-Factor
Un-insulated Metal	1.20
Insulated Metal	0.60
Wood	0.50
Insulated, nonmetal edge, max 45% glazing, any glazing double pane	0.35

**IECC Table 102.1.3(3)  
DEFAULT GLAZED FENESTRATION SHGC**

Single Glazed		Double Glazed		Glass Block
Clear	Tinted	Clear	Tinted	
0.8	0.7	0.7	0.6	0.6

**Residential Component Performance Method #2**

**Note:** If you have on-line access, it is strongly suggested that you use free *REScheck* program available on DOE website (see above).

- **Fill out Component Performance Analysis worksheet (attached) in its entirety.**
- **Fill out the IECC Energy Code Synopsis.**
- **Provide two wet-singed copies of each with plans submittal to the building department.**

# 2006 Residential Energy Code Synopsis and Checklist

(provide 2 copies with building plans)

<p style="text-align: center;">2006 International Energy Conservation Code Synopsis-Residential (Per approved analysis enclosed)</p>	<p style="text-align: center;">2006 Building IECC Code Requirements Check List</p>
<p><b>Method of Compliance</b> used: _____ (fill in applicable spaces below)</p>	<p><b>Construction Documentation:</b> An energy code compliance report must accompany plans for review. The information in this document must be accurately reflected on the building plans. All information provided will be field verified by the inspector.</p>
<p><b>Building Envelope:</b></p>	
<p>Attic Insulation R-Value: type 1: <u>R</u>-_____ type 2: <u>R</u>-_____</p>	<p><b>Insulation:</b> All insulation shall be labeled. For <b>blow-in products</b>, one package must be saved for field verification. Blow-in insulation <b>certification</b> must be provided prior to building final inspection.</p>
<p>Floors over unheated space: R-Values: <u>R</u>-_____</p>	<p><b>Batts</b> shall <b>not</b> be <b>compressed</b>, and shall be <b>split</b> at electrical wiring and piping interruptions. <b>Insulation</b> shall be installed in substantial contact with the <b>air barrier</b>. <b>Batts</b> installed in walls with one side open shall be permanently <b>held in place</b> by wires, strapping or staples.</p>
<p>Wall Insulation : wall type 1: R-_____ wall type 2: R-_____</p>	
<p><b>Fenestration Components:</b></p>	
<p>Fixed windows: U-_____ SHGC: _____</p>	<p><b>Windows:</b> All new windows and doors must <b>display NFRC labels</b>, clearly displaying U-values and SHGC coefficients (for glazed area) for field verification. <b>Re-used/unlabeled windows</b> or doors must meet minimum <b>default</b> values listed in code.</p>
<p>Operable windows: U-_____ SHGC: _____</p>	
<p>Glass block: U-_____ SHGC: _____</p>	
<p>Glass Doors: Sliding Patio Doors: U-_____ SHGC: _____</p>	<p><b>Skylights:</b> <b>NFRC labels</b> shall be clearly displayed, listing U and SHGC values. <b>Skylight shafts</b> shall be insulated with R-13 insulation, secured in place.</p>
<p>French Doors: U-_____ SHGC: _____</p>	
<p>Solid Doors R-Values: R-_____</p>	<p><b>Caulking and Sealants:</b> <b>Exterior joints, seams, or penetrations</b> in the <b>air barrier</b> that are sources of air leakage, shall be sealed with durable caulking materials, closed with gasketing systems, taped or covered with moisture vapor-permeable housewrap. Provide caulking or sill seal at joint between <b>sill plates</b> of framed exterior walls and foundation. The space between framed rough openings and <b>door or window frames</b> must be foam insulated or caulked. Seal <b>recessed lighting, plumbing, electrical box</b> and <b>wiring</b> penetrations in the <b>air barrier</b> against <b>air infiltration</b>. <b>Exterior doors</b> must be weather-stripped. <b>Attic access</b> opening covers must be gasketed to prevent air leakage.</p>
<p>Overhead door R-Value: R-_____</p>	
<p>HVAC: Type of System: Simple _____ Complex _____</p>	
<p>Description: _____</p>	<p><b>HVAC System:</b> Mechanical efficiency and capacity of new units must appear on equipment.</p>
<p>Size of System: Heat: _____ Cool: _____</p>	<p><b>Thermostats:</b> Devices shall have a deadband range of 5° F within which the supply of heating and cooling energy is shut off or reduced to a minimum.</p>
<p>Efficiency Ratings: Heat: _____% AFUE Cool: _____ SEER</p>	<p><b>Heat Pumps:</b> Systems having supplementary electrical resistance heaters shall have controls that prevent the heater operation when the heating load is capable of being met by the pump.</p>
<p>Duct Insulation: Supply: R-_____ Return: R-_____</p>	<p><b>Ducts and Plenums:</b> All supply and return-air plenums shall have all joints and connections securely fastened and sealed with welds, gaskets, mastics, mastic-plus-embedded-fabric systems or approved tapes.</p>
<p>Hydronic system: Pipe insulation: heat _____in; cool _____in.</p>	<p><b>Duct and Plenum Insulation:</b> Unless located in conditioned space, all supply ducts and plenums shall have minimum <b>R-6</b> insulation. Return air ducts and plenums shall be insulated with minimum <b>R-6</b> insulation</p>
<p><b>Water Service System:</b></p>	<p><b>Hot Water Heaters:</b> Units shall be <b>labeled</b> as to their input rating and efficiency. For <b>Non-circulating hot water systems</b>, all hot water piping installed in unconditioned spaces, including under slabs, shall be insulated with <b>R-2</b> (min.) <b>Circulating hot water heating</b> hot water lines shall be insulated with <b>R-2</b> pipe insulation (min.)</p>
<p>Type (X): electric:___ gas fired:___ instantaneous:___</p>	
<p>Input Rating: _____Btu/hr Storage capacity: _____gal</p>	
<p>Efficiency Rating: _____%</p>	
<p>Re-circulating pump (X): Yes _____ No _____</p>	
<p>(If yes) Temp setting: _____degrees; Pipe insulation: _____in</p>	