

**2009 International Energy Conservation Code  
Prescriptive Compliance Requirements for Single Family and Two Family Dwellings  
New Residences, Additions and Remodels**

This document does not include weighted averages for fenestration, unlabeled fenestrations, site built fenestrations, mass walls, metal framing or crawl spaces. See IECC for additional information.

Address _____	Permit Number _____
Prepared By (Name) _____	Signature _____
	Date _____

**Energy Code Requirements by Component.** The building thermal envelope, air barrier, fenestrations and systems shall meet the following.

	<b>Component</b>	<b>Your Residence</b> Check one box from each of the items below. If there is only one item in the box, it is a mandatory item with no other option.
<b>Fenestrations</b>	<b>Doors</b>	<input type="checkbox"/> Each door has a maximum 0.50 U-Factor.
	<b>Windows</b>	<input type="checkbox"/> Each window has a maximum 0.50 U-Factor and a maximum 0.30 Solar Heat Gain Coefficient.
	<b>Skylight</b>	<input type="checkbox"/> Each skylight has a maximum 0.65 U-Factor and a maximum 0.30 Solar Heat Gain Coefficient. <input type="checkbox"/> No Skylights are used.
	<b>Air Infiltration</b>	<input type="checkbox"/> Windows, skylights and sliding glass doors shall have a listing demonstrating an air infiltration rate of no more than 0.3 cfm per square foot, and swinging doors no more than 0.5 cfm per square foot.
	<b>Unlabeled Fenestration Products</b>	<input type="checkbox"/> All doors, windows and skylights will be labeled.
	<b>Site Built Fenestration Products</b>	<input type="checkbox"/> No site built fenestration products are used.
<b>Insulation</b>	<b>Ceiling</b>	<input type="checkbox"/> Minimum R-30 insulation tight to ceiling. <input type="checkbox"/> Minimum R-30 insulation tight to roof sheathing.
	<b>Wood Frame Wall</b>	<input type="checkbox"/> Minimum R-13 insulation.
	<b>Floor</b> (above garage and cantilevered)	<input type="checkbox"/> R-19 Cavity insulation tight to underside of floor sheathing. <input type="checkbox"/> I do not have a floor assembly that is part of the building thermal envelope..
<b>Foundation</b>	<b>Basement Wall</b>	<input type="checkbox"/> R-5 Minimum continuous insulating sheathing. <input type="checkbox"/> R-13 Minimum cavity insulation on interior of wall. <input type="checkbox"/> I do not have a basement.
	<b>Slab-on-Grade</b>	<input type="checkbox"/> The slab on grade is unheated. <input type="checkbox"/> The slab on grade is heated, I will provide R-5 perimeter insulation to the lesser of bottom of the footing or 24-inches deep. <input type="checkbox"/> I do not have a slab on grade.
<b>Air Leakage</b>	<b>Building Thermal Envelope Air Leakage</b>	<input type="checkbox"/> I will hire a third party firm to provide air sealing testing. <input type="checkbox"/> I wish City of Henderson to provide air sealing inspections. I will schedule these inspections at the appropriate time. See Inspection Schedule for requirements.
	<b>Wood Burning Fireplace</b>	<input type="checkbox"/> Provide gasketed doors, outdoor combustion air, and comply with IRC Chapter 10 including local amendments. <input type="checkbox"/> No wood-burning fireplace included.
	<b>Recessed Lighting</b>	<input type="checkbox"/> Recessed lighting installed in the building thermal envelope shall be IC-rated, and shall be sealed to the interior wall or ceiling covering. <input type="checkbox"/> I do not have recessed lighting in the thermal envelope.

<b>HVAC Systems</b>	<b>Heat Loss calculations and Equipment Sizing</b>	<input type="checkbox"/> Provide ACCA Manual S heating and cooling equipment sizing and ACCA Manual J heating and cooling calculations or other approved methodologies. <input type="checkbox"/> This is a remodel and/or addition without any new heating/cooling equipment installed.
	<b>Thermostat</b>	<input type="checkbox"/> Provide programmable thermostat for each system. <input type="checkbox"/> This is a remodel and/or addition without any new heating/cooling equipment installed.
	<b>Duct Insulation</b>	<input type="checkbox"/> Ducts shall be insulated; supply ducts to a minimum of R-8 and all other ducts to a minimum of R-6. <input type="checkbox"/> All ducts are located within the building thermal envelope, therefore no duct insulation is required.
	<b>Duct Sealing</b>	<input type="checkbox"/> Ducts, plenums, etc. shall be sealed.
	<b>Duct Testing</b>	<input type="checkbox"/> The heating and cooling system on this project does not use any ductwork. <input type="checkbox"/> I will hire a third party firm to provide duct testing. The third party firm shall be a certified HERS Rater, or a firm listed on Clark County Building Department Quality Assurance approved list of duct testing agencies. <input type="checkbox"/> This is a remodel and/or addition without any new heating/cooling equipment installed and I wish to utilize inspection exception.
	<b>Mechanical System Piping</b>	<input type="checkbox"/> Insulated to a minimum of R-3. <input type="checkbox"/> I have package units and no mechanical system piping.
	<b>Outside Air and Exhaust</b>	<input type="checkbox"/> Provide automatic or gravity dampers on all outside air intake vents and exhaust terminations. Clothes dryer exhaust vents through the roof are exempt.
	<b>Service Hot Water</b>	<input type="checkbox"/> Non Circulating System. All service hot water piping installed in unconditioned spaces, including under-slab piping, shall be insulated to at least R-2. <input type="checkbox"/> Circulating System. All service hot water piping installed in unconditioned spaces, including under-slab piping, shall be insulated to at least R-2, and shall include an automatic or readily accessible manual switch that can turn off the hot water circulating pump when the system is not used. <input type="checkbox"/> This is a remodel and/or addition without any new hot water installed.
	<b>Electrical Lighting</b>	<input type="checkbox"/> A minimum of 50 percent of the lamps in permanently installed lighting fixtures shall be high-efficacy lamps.
	<b>Sun Room</b>	<input type="checkbox"/> The sun room is not thermally isolated from the remainder of the building and will comply with all requirements. <input type="checkbox"/> The sun room is thermally isolated from the dwelling and shall comply as follows; <ul style="list-style-type: none"> <li>▪ R-19 minimum ceiling insulation</li> <li>▪ R-13 minimum wall insulation</li> <li>▪ 0.50 maximum U-Factor</li> <li>▪ 0.75 maximum Skylight U-Factor</li> </ul> <input type="checkbox"/> I do not have a sun room

## **Additional Requirements**

### **Standard Notes**

- All materials, systems and equipment shall be installed in accordance with the manufacturer's installation instructions and the adopted codes.

### **Submittal Requirements Prior to Final Inspection**

The contractor shall provide a certificate for energy conservation. The certificate shall:

- be permanently installed on a wall adjacent to the water heater
- be approved by the jurisdiction
- be completed by the builder or registered design professional
- have a heading stating "DO NOT REMOVE" in 1/2" minimum bold face letters
- list the predominant R-values of insulation installed in or on ceiling/roof, walls, foundation (slab, basement wall, crawlspace wall and/or floor) and ducts outside conditioned spaces
- list U-factors for fenestration
- List solar heat gain coefficient (SHGC) of fenestration
- List the types and efficiencies of heating, cooling and service water heating equipment
- Where there is more than one value for each component, the certificate shall list the value covering each area or component separately.

The contractor shall provide maintenance instructions for equipment and systems that require preventive maintenance.

- Required regular maintenance actions shall be clearly stated and incorporated on a readily accessible label.
- Include the title or publication number for the operation and maintenance manual for that particular model and type of product.

Provide report of test showing all duct assemblies located outside the conditioned space comply with Section 403.2.2.

Provide building envelope air tightness test results showing compliance with Section 402.4.2.1, or visual inspection results showing compliance with Section 402.4.2.2.

### **Building Thermal Envelope and Insulation**

- The building thermal envelope includes the basement walls, exterior walls, floor, roof, and any other building air barrier element(s) that enclose *conditioned space*. This boundary also includes the air barrier between *conditioned space* and any exempt or unconditioned space. The building thermal envelope shall comply with the minimum R-values in the table.
- R-values for walls represent the sum of cavity insulation plus insulated sheathing, if any. Do not count any other material.
- Mass walls shall be above grade walls of concrete block, concrete, insulated concrete form, masonry cavity, brick (other than veneer), earth (adobe, compressed earth block, rammed earth) and timber/logs. See IECC.

- A heated slab is slab-on-grade construction in which the heating elements, hydronic tubing, or hot air distribution system is in contact with, or placed within or under, the slab.
- Total UA average calculation is not included in this handout. See IECC.
- Access doors from conditioned spaces to unconditioned spaces (e.g., attics and crawl spaces) shall be weatherstripped and insulated to a level equivalent to the insulation on the surrounding surfaces.
- Provide a barrier to prevent loose fill insulation from spilling out of the attic when access is open. This is not required for batts and other "fixed" insulation.
- Catwalks and equipment platforms shall be constructed so as to not compress any insulation.
- Basement wall insulation must extend from the top of the wall down 10 feet below grade or to the basement floor, whichever is less.
- Insulation on exterior of building at or below grade shall be protected by rigid, opaque and weather-resistant covering to a minimum of six inches below grade.
- Insulation Marking, Certification and labeling Requirements
  - Each piece of building thermal envelope insulation 12-inches or greater in width shall be installed such that the manufacturers R-value identification mark is readily observable for inspection.
  - For each element of the building thermal envelope, other than those that are more than 12-inches in width and the manufacturers R-value mark is visible, the insulation installers shall provide a certification listing;
    - type,
    - manufacturer, and
    - R-value of insulation
  - Blown or sprayed roof/ceiling insulation (fiberglass or cellulose) shall be marked. Markers shall;
    - be fixed to the trusses or joists
    - be installed throughout the attic space
    - be installed at least one for every 300 square feet face the attic access opening
    - indicate the minimum initial installed thickness
    - include the thickness written in inches
    - have numbers a minimum of 1-inch in height
  - For blown or sprayed insulation (fiberglass and cellulose), the insulation installers shall provide a certification for;
    - The initial installed thickness,
    - Settled thickness,
    - Settled R-value,
    - Installed density,
    - Coverage area, and
    - Number of bags installed.

### **Fenestrations**

- Fenestrations include skylights, roof windows, vertical windows (fixed or moveable), opaque doors, glazed doors, glazed block and combination opaque/glazed doors. Fenestration includes products with glass and nonglass glazing materials.
- All fenestration products shall be labeled from the manufacturer showing compliance. Window, door and skylight U-factors and SHGCs must be determined from a National Fenestration Rating Council (NFRC) rating that is independently certified and set forth on a label on the product.
- Solar Heat Gain Coefficient applies to each door, window, skylight or other fenestration product with 50% or more glazed area.

### **Air Leakage**

- The building thermal envelope shall be durably sealed to limit infiltration. The sealing methods between dissimilar materials shall allow for differential expansion and contraction. The following shall be caulked gasketed, weatherstripped or otherwise sealed with an air barrier material, suitable film or solid material:
  - All joints, seams, and penetrations.
  - Site-built windows, doors and skylights.
  - Openings between window and door assemblies and their respective jambs and framing.
  - Utility penetrations.
  - Dropped ceilings or chases adjacent to the thermal envelope.
  - Knee walls.
  - Walls and ceilings separating a garage from conditioned spaces.
  - Behind tubs and showers on exterior walls.
  - Common walls between dwelling units.
  - Attic access openings.
  - Rim joist junction.
  - Other sources of infiltration.
- Sealing of these items shall be inspected or a door test shall be performed.
  - If inspection option is used, inspections shall be completed by City of Henderson Building Inspectors. The permit holder shall schedule energy inspections at the appropriate intervals during construction. See Energy Inspection Table for more information.
  - The testing option shall be performed by a licensed HERS rating firm, hired by permittee. A report shall be submitted to the building inspector prior to pre-final inspection.
  - The firm shall be a certified HERS Rating firm or shall be listed as an approved special inspection firm on Clark County list.

### **HVAC Systems**

- Heating and cooling equipment shall be sized in accordance with ACCA Manual S based on building loads calculated in accordance with ACCA Manual J or other approved heating and cooling calculations methodologies. These calculations are typically performed by a contractor or an engineer.
  - Exceptions:
    - Same-for-same heating or cooling equipment change-outs.
    - Additions and remodels that utilize existing equipment and do not add any new equipment.
- Temperature Controls.
  - At least one thermostat shall be provided for each separate heating and cooling system.
  - The thermostat shall be capable of controlling the heating and cooling system on a daily schedule to maintain different temperature set points at different times of the day.
  - This thermostat shall include the capability to set back or temporarily operate the system to maintain temperatures down to 55°F or up to 85°F.
  - The thermostat shall initially be programmed with a heating temperature set point no higher than 70°F and a cooling temperature set point no lower than 78°F.
- Ducts.
  - Building framing cavities shall not be used as ducts.
  - All ducts, air handler connections at the plenum and filter boxes shall be sealed to comply with the Uniform Mechanical Code.
  - Duct tightness test. All duct assemblies, including manufacturer's air handler enclosure must be tested for leakage.
    - This test may be done during duct HVAC rough-in, or when building is complete.
    - The test shall comply with IECC Section 403.2.2.
    - This test is not required if the entire duct assembly and air handler are located within the conditioned space.
    - Permit holder shall hire firm to provide this test. The third party firm shall be a:
      - Certified HERS Rater, or
      - Firm listed on Clark County Building Department Quality Assurance approved list of duct testing agencies.
- Duct Testing Exceptions:
  - New duct work is not installed.
  - New heating and/or cooling units are not installed.
  - Same-for-same heating or cooling equipment change-outs where ducts are not added and/or modified.

### **Electrical Power and Lighting Systems**

- High-efficacy lamps include compact fluorescent lamps, T-8 or smaller diameter linear fluorescent lamps, or lamps with a minimum efficacy of:
  - 60 lumens per watt for lamps over 40 watts,
  - 50 lumens per watt for lamps over 15 watts to 40 watts, and
  - 40 lumens per watt for lamps 15 watts or less.

**Air Barrier and Insulation Inspection Criteria and Codes**

All of the following components must be inspected and accepted by the City of Henderson Building Inspection, or the building must be tested in accordance with IECC Section 402.4.2.1, Air Leakage Door Fan Test.

Component	Criteria	Inspection Code to be Scheduled
<b>Air barrier and thermal barrier</b>	<ul style="list-style-type: none"> <li>• Exterior thermal envelope insulation for framed walls is installed in substantial contact and continuous alignment with building envelope air barrier.</li> <li>• Breaks or joints in the air barrier are filled or repaired.</li> <li>• Air-permeable insulation is not used as a sealing material.</li> <li>• Air-permeable insulation is inside of an air barrier.</li> </ul>	1570 Building Insulation
<b>Ceiling/attic</b>	<ul style="list-style-type: none"> <li>• Air barrier in any dropped ceiling/soffit is substantially aligned with insulation and any gaps are sealed.</li> <li>• Attic access (except unvented attic), knee wall door, or drop down stair is sealed.</li> </ul>	1515 Rough Energy 1570 Building Insulation
<b>Walls</b>	<ul style="list-style-type: none"> <li>• Corners and headers are insulated.</li> <li>• Junction of foundation and sill plate is sealed.</li> </ul>	1515 Rough Energy
<b>Windows and doors</b>	<ul style="list-style-type: none"> <li>• Space between window/door jambs and framing is sealed.</li> </ul>	1515 Rough Energy
<b>Rim joists</b>	<ul style="list-style-type: none"> <li>• Rim joists are insulated and include an air barrier.</li> </ul>	1515 Rough Energy 1570 Building Insulation
<b>Floors</b> (including above-garage and cantilevered floors)	<ul style="list-style-type: none"> <li>• Insulation is installed to maintain permanent contact with underside of subfloor decking.</li> <li>• Air barrier is installed at any exposed edge of insulation.</li> </ul>	1570 Building Insulation
<b>Crawl space walls</b>	<ul style="list-style-type: none"> <li>• Insulation is permanently attached to walls.</li> <li>• Exposed earth in unvented crawl spaces is covered with Class I vapor retarder with overlapping joints taped.</li> </ul>	1570 Building Insulation
<b>Shafts, penetrations</b>	<ul style="list-style-type: none"> <li>• Duct shafts, utility penetrations, knee walls and flue shafts opening to exterior or unconditioned space are sealed.</li> </ul>	1515 Rough Energy
<b>Narrow cavities</b>	<ul style="list-style-type: none"> <li>• Batts in narrow cavities are cut to fit, or narrow cavities are filled by sprayed/blown insulation.</li> </ul>	1570 Building Insulation
<b>Garage separation</b>	<ul style="list-style-type: none"> <li>• Air sealing is provided between the garage and conditioned spaces.</li> </ul>	1515 Rough Energy
<b>Recessed lighting</b>	<ul style="list-style-type: none"> <li>• Recessed light fixtures are air tight, IC rated, and sealed to drywall.</li> <li>• Exception-fixtures in conditioned space.</li> </ul>	1515 Rough Energy
<b>Plumbing and wiring</b>	<ul style="list-style-type: none"> <li>• 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.</li> </ul>	1570 Building Insulation
<b>Shower/tub on exterior wall</b>	<ul style="list-style-type: none"> <li>• Showers and tubs on exterior walls have insulation and an air barrier separating them from the exterior wall.</li> </ul>	1515 Rough Energy 1570 Building Insulation
<b>Electrical/phone box on exterior walls</b>	<ul style="list-style-type: none"> <li>• Air barrier extends behind boxes or air sealed-type boxes are installed.</li> </ul>	1515 Rough Energy
<b>Common wall</b>	<ul style="list-style-type: none"> <li>• Air barrier is installed in common wall between dwelling units.</li> </ul>	1515 Rough Energy
<b>HVAC register boots</b>	<ul style="list-style-type: none"> <li>• HVAC register boots that penetrate building envelope are sealed to subfloor or drywall.</li> </ul>	1515 Rough Energy 1500 All Roughs
<b>Fireplace</b>	<ul style="list-style-type: none"> <li>• Fireplace walls include an air barrier.</li> </ul>	1515 Rough Energy