

## **What are the major requirements of the new Georgia residential energy code?**

### **Insulation**

The Georgia residential energy code consists of Chapter 4 of the 2009 IECC with the 2011 Georgia supplements and amendments. It sets minimum insulation levels for ceilings, walls and floors. Trade-offs are allowed between components of the building envelope, but to follow the typical prescriptive path, R-values must be no less than the following values for each of Georgia's three climate zones (CZ)—designations which specify climate-dependent requirements between, for instance, a home in Atlanta (CZ3), a home in Savannah (CZ2) or a home in Rome (CZ4).

Component	CZ2	CZ3	CZ4
Attic Kneewalls	R-18	R-18	R-18
Cavity Walls	R-13	R-13	R-13
Mass Walls	R-4	R-5	R-5
Roof/Ceiling	R-30	R-30	R-38
Floors over unheated spaces	R-13	R-19	R-19
Basement Walls	R-0	R-5	R-10
Crawl Space Walls	R-0	R-5	R-10
Slab	R-0	R-0	R-0

### **Windows and Doors**

The 2009 IECC requires that all residential windows have a label displaying the window U-factor and Solar Heat Gain Coefficient (SHGC). Furthermore, all windows must have a U-factor of 0.50 or less and all glazing must not exceed an SHGC of 0.30. These minimum requirements are easily met by using double-paned, low-e windows currently available in the market. Access doors leading to attics and other unconditioned spaces must be weatherstripped and insulated to R-5, for vertical doors and pull-down stairs, and R-19, for hatches/scuttle hole covers.

### **Air sealing the building envelope**

Because air infiltration is often a significant energy drain, the 2009 IECC makes specific provisions for caulking, gasketing and sealing penetrations in the building envelope. For example, recessed lights between a living space and an unconditioned attic must be airtight and rated for insulation contact. The air sealing graphics included as Appendix A of the Georgia amendments show in detail the best practices for sealing each of the major penetrations.

### **Ducts**

Because duct leakage is the biggest cause of energy loss in homes, all supply and return ducts in conditioned and unconditioned space must be sealed with mastic to a thickness of 2 mm (about the thickness of a nickel). Duct tape is not permitted as a sealant on any ducts. UL-181 pressure-sensitive tape may

be used to assemble fibrous duct board, but the seams must be sealed over with mastic. The use of a building cavity itself as supply or return duct is expressly prohibited although a duct may be located inside this cavity. Supply ducts in attics must be insulated to a minimum of R-8; all other ducts in unconditioned space should be insulated to R-6.

### **Mechanical Requirements**

The 2009 IECC requires heating and cooling design loads for sizing HVAC systems be calculated using ACCA's Manual J or equivalent method. Equipment should be sized to meet the loads.

### **Lighting**

The new energy code stipulates that half of all light bulbs are high-efficacy, use automated control systems, or both. Light bulbs that meet the standard for high efficacy include compact fluorescent lamps (CFLs), T8 or T5 tubular fluorescents, and most light-emitting diodes (LEDs).

### **Duct and Envelope Tightness (DET) Verification**

One of the most groundbreaking changes in the Georgia energy code is the code requirement to test ducts and building envelope for tightness. DET verification requires all houses at post-construction to meet tightness standards of less than 7 ACH<sub>50</sub>. Ductwork may be tested with one of three methods at either rough in or post-construction. These tests must be performed by a certified DET verifier or an individual with similarly qualifications, such as a BPI Building Analyst or HERS Rater.

### **What are the differences between the old and the new code?**

The 2009 IECC is much like the 2006 IECC with a few exceptions. The new code introduces new testing requirements for the duct and building envelope tightness. The results of these tests, along with other information pertinent to the performance of the home, such as insulation values and load calculations, must be included on the compliance certificate, located either near the air handler or electrical distribution panel. In addition, the IECC 2009 requires basement wall insulation and that half of all lighting be energy efficient.

### **What about enforcement?**

Enforcement levels vary by jurisdiction, but all homes built in Georgia are required to comply. Consistent enforcement creates a level playing field and therefore rewards the conscientious builder.

Additionally, the State of Georgia, by accepting funds from the American Recovery and Reinvestment Act of 2009, pledged to reach 90% energy code compliance by 2017, adding a new level of significance to both enforcement and compliance.

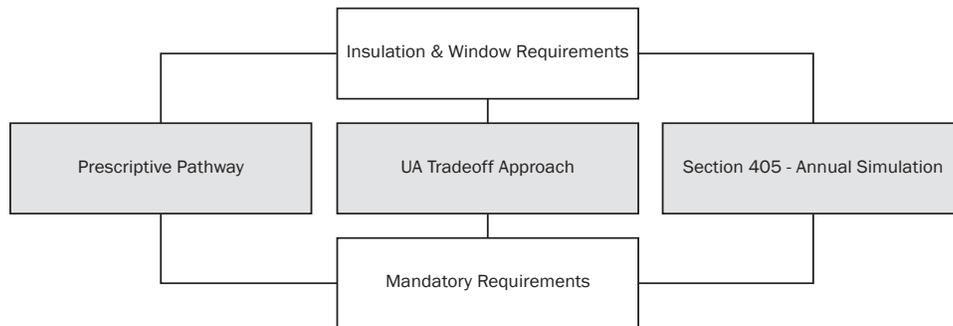
## Compliance Pathways

The 2009 IECC contains several different pathways to compliance:

- Prescriptive Path – a simple, build-by-the-chart approach
- UA Analysis/REScheck software – a free, user-friendly approach that allows basic trade-offs between envelope components
- Section 405 Annual Simulation – a method used mainly for complicated construction

A builder can choose the pathway that best fits his/her desired insulation levels, construction type and climate zone. Production builders may most often opt for the prescriptive pathway, the most straightforward approach, which requires builders to follow a “checklist” of values without wavering. The second approach is to use the REScheck software to trade envelope components, e.g. better windows for less ceiling insulation, but never trading below the minimum insulation values listed in the Georgia amendments.

For more complicated construction such as a log house with passive solar features, the annual simulation pathway will offer the most flexibility. Compliance must be shown by using an energy simulation, which is often performed by a HERS Rater. Regardless of the compliance pathway chosen, all houses must satisfy the mandatory requirements such as duct and air sealing outlined in the energy code.



## REScheck (UA Tradeoff) Method

The REScheck software is powerful and easy to use. It allows builders to trade off nearly any envelope component against another. A builder only has to enter the component area and its energy characteristics, such as R-value, U-factor or SHGC. The software calculates the energy losses or gains for each individual component and automatically determines compliance. The application creates reports describing the assumptions made, the basic requirements (such as duct- and air-sealing) that must be satisfied and the energy characteristics for each proposed component. These reports may be used to document compliance in most jurisdictions.

## Sample REScheck Compliance Certificate Excerpt:

LOCATION: Atlanta, Georgia	GLAZING AREA: 16%	HDD <sup>1</sup> : 3499	CONSTRUCTION TYPE: Single Family		
	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Glazing or Door U-Factor	UA <sup>2</sup>
Ceiling: Cathedral	2200	19.0	0.0	-----	114
Wall: Wood Frame, 16" o .c.	1380	13.0	0.0	-----	92
Window: Wood Frame:Double Pane with Low-E	220	-----	-----	0.350	77
Door: Solid	40	-----	-----	0.500	20
Basement Wall: Solid Concrete or Masonry	1600	0.0	5.0	-----	118
Basement Slab: 9.0' ht; 9.0' below grade; 9.0' insul. depth	-----	-----	-----	-----	-----

COMPLIANCE: Passes<sup>3</sup> 5.4% better than code    Max. UA = 445    Your UA = 421    Max. SHGC: 0.30    Your SHGC: 0.30

- 1 HDD = Heating Degree Days
- 2 UA = Heat flow through a building component (U-factor x Area)
- 3 COMPLIANCE: Home passes if its UA is less than or equal to maximum UA.

## Where can I get more information?

For more information on the Georgia Energy Code, contact the Codes and Industrialized Buildings section of the Georgia Department of Community Affairs, 404-679-3118 or [www.dca.state.ga.us](http://www.dca.state.ga.us), or Southface, [info@southface.org](mailto:info@southface.org). The REScheck prescriptive packages and software as well as technical assistance are available free of charge from the U.S. Department of Energy at [www.energycodes.gov](http://www.energycodes.gov). A number of code-related resources, including an illustrated field guide and excerpts from the energy code, may be found at [www.southface.org](http://www.southface.org).