

REScheck for the 2006 IECC
February 15, 2007

Welcome

Residential Compliance Tools – slide 2



When Does REScheck Apply? – slide 3

Residential New Construction and Additions

- 1-2 family dwellings
- Multifamily dwellings: 3 or more attached dwelling units 3 or fewer stories in height
- State Dependent
 - Not all states have the same code, some states have state specific energy codes
 - Check to see what code is applicable in your state and whether REScheck compliance reports are accepted
 - Status of State Codes
 - http://www.energycodes.gov/implement/state_codes/index.stm

Residential Requirements – slide 4

- 1) Mandatory Requirements:
 - Moisture Control
 - Air Leakage - Recessed Lighting Fixtures
 - Infiltration Control
 - Building Mechanical Systems and Equipment
 - Service Water Heating

- Duct Insulation
- 2) Climate Specific Requirements:
 - Foundations
 - Crawlspace
 - Slabs
 - Basements
 - Above Grade Walls
 - Skylights, Windows, and Doors
 - Roofs

Building Envelope Specific Requirements – slide 5

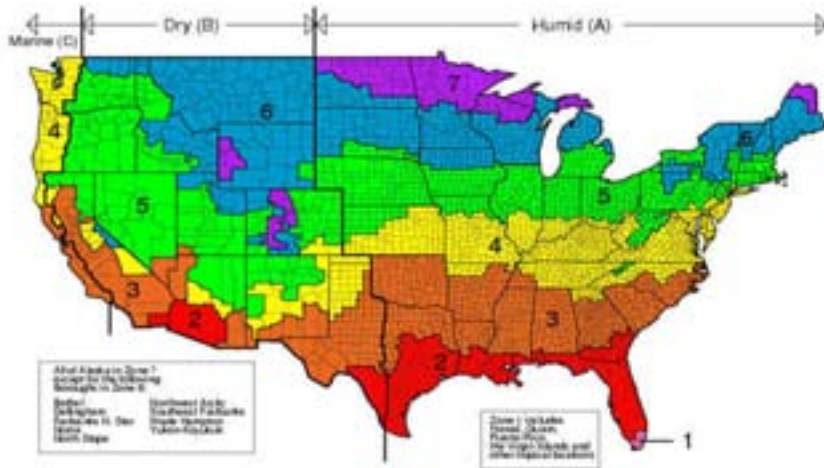
- Building envelope consists of:
 - Fenestration
 - Ceiling
 - Walls
 - Above grade
 - Below grade
 - Mass wall
 - Floor
 - Slab
 - Crawlspace

What's New in REScheck for 2006 IECC – slide 6

- Climate Zones
- Envelope Requirements
- Fenestration Hard Limits
- New Software Inputs
 - Conditioned Floor area
 - SHGC
- Panel Certificate
- Different Approach to HVAC Trade-offs

Climate Zones in 2006 IECC & REScheck – slide 7

Now there are 8



Insulation and Fenestration – slide 8

Table 402.1.1 – Insulation and Fenestration Requirements by Component

CLIMATE ZONE	FENESTRATION U FACTOR	SKYLIGHT U FACTOR	GLAZED FENESTRATION SHGC	CeILING R VALUE	WOOD FRAME WALL R VALUE	MASS WALL R VALUE	FLOOR R VALUE	BASEMENT WALL R VALUE	SLAB R VALUE & DEPTH	CRAWL SPACE WALL R VALUE
1	1.20	0.75	0.40	30	13	3	13	0	0	0
2	0.75	0.75	0.40	30	13	4	13	0	0	0
3	0.65	0.65	0.40	30	13	5	10	0	0	5 / 13
4 except Marine	0.40	0.60	NR	38	13	5	10	10 / 13	10, 2 ft	10 / 13
5 and Marine 4	0.35	0.60	NR	38	19 or 13+5	13	30	10 / 13	10, 2 ft	10 / 13
6	0.35	0.60	NR	49	19 or 13+5	15	30	10 / 13	10, 4 ft	10 / 13
7 and 8	0.35	0.60	NR	49	21	19	30	10 / 13	10, 4 ft	10 / 13

U-Factor Requirements – slide 9

Table 402.1.3 – Equivalent U-Factors

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT U-FACTOR	CEILING U-FACTOR	FRAME WALL U-FACTOR	MASS WALL U-FACTOR	FLOOR U-FACTOR	BASEMENT WALL U-FACTOR	CRAWL SPACE WALL U-FACTOR
1	1.20	0.75	0.035	0.082	0.197	0.064	0.360	0.477
2	0.75	0.75	0.035	0.082	0.165	0.064	0.360	0.477
3	0.65	0.65	0.035	0.082	0.141	0.047	0.360	0.136
4 except Marine	0.40	0.60	0.030	0.082	0.141	0.047	0.059	0.065
5 and Marine 4	0.35	0.60	0.030	0.060	0.082	0.033	0.059	0.065
6	0.35	0.60	0.026	0.060	0.06	0.033	0.059	0.065
7 and 8	0.35	0.60	0.026	0.057	0.057	0.033	0.059	0.065

2006 IECC Compliance Paths and REScheck Approach – slide 10

- 2006 IECC (2 Main Paths)
 - Prescriptive
 - Sub paths (R-value computation, U-factor Alternative, and Total UA)
 - Performance
- REScheck Approach
 - Total UA Alternative (same as U-factor alternative but allows trade-offs across all envelope components)
 - Limited scope performance analysis for HVAC trade-offs

Fenestration – 2006 IECC says – slide 11

- Windows in colder zones have both prescriptive maximum U-factor requirement and a hard trade-off limit
- An area-weighted average of fenestration can be used to satisfy the U-factor & SHGC requirements
 - Both are subject to hard limits, even in trade-offs
- NFRC rated and certified

Exceptions:

 - Unrated single-pane products comply in Climate Zone 1
 - Unrated double-pane with thermal break complies in Climate Zones 2 and 3
- 15 sq. ft. of glazing (and one opaque door) can be exempted
 - For example, decorative glass on/near front door

Fenestration – REScheck – slide 12

- Area-weighted average U-factor and SHGC are subject to hard limits, even in trade-offs
- An area credit of 15 sq.ft. is applied to all fenestration
 - The software looks for the highest glazing U-factor and exempts up to 15 sq. ft. of it
 - REScheck eliminates this 15 sq.ft. in both the proposed UA and the required UA calculation.
- A UA credit for the user-specified door with the poorest U-factor is applied similarly to the glazed fenestration exemption
- Window replacement cannot be shown using REScheck

Windows – U-Factors – slide 13

- Hard trade-off limits (cannot be exceeded even in trade-offs)
 - U-0.48 maximum in Zones 4 and 5
 - U-0.40 maximum in Zones 6-8
 - U-0.75 for skylights in Zones 4-8
 - These are based on building average; individual windows or skylights can be worse if the area-weighted average meets these requirements

Windows – SHGC – slide 14

- Solar Heat Gain Coefficient
 - Prescriptive Requirement
 - SHGC of 0.40 or lower required in Climate Zones 1-3 using an area-weighted average
 - Mandatory Requirement (hard trade-off limit) in performance path trade-offs
 - SHGC cannot exceed 0.50 when in Climate Zones 1-3
 - Default SHGCs cannot be used in Climate Zones 1-3

Ceilings – slide 15

- Meet or exceed R-values
- Requirements vary by assembly type
- Compliance accounts for insulation between framing AND continuous insulation over framing
- Special-case allowances
 - Cathedral Ceilings (no attics)
 - Raised or Energy Truss

Raised Heel Truss – slide 16

- Raised Heel/Energy Truss credit if insulation is full height over exterior wall
 - R-30 instead of R-38
 - R-38 instead of R-49



Above Grade Walls – slide 17

Insulate rim joists

Insulate walls including those next to unconditioned spaces

Wood Frame Walls

Climate Zones

- 1-4: R-13
- 4 marine and 5-8: R-19 or 13+5

Floors over Unconditioned Space – slide 18

- Space can be unheated basement or a crawlspace or outdoor air
- Zones 1-2: R-13
- Zones 3-4AB: R-19
- Zones 4C-8: R-30

- If you don't meet these insulation levels, additional insulation would be required on other components to comply

Below-Grade Walls – slide 19

- => 50% below grade
- Zones 1-3: R-0
- Zones 4-8: R-10 (continuous) or R-13 (cavity)

Compliance/Documentation/Inspections – slide 20

- Code Official has final authority
- Electronic media can be used
 - Email compliance report
- Construction work for which a permit is required is subject to inspection
- Certificate is required

Certificate – slide 21

- Permanently posted on the electrical distribution panel
- Shall include the following:
 - R-values of insulation installed for the thermal building envelope including ducts outside conditioned spaces
 - U-factors for fenestration
 - SHGC for fenestration
 - HVAC efficiencies
 - SWH equipment



2006 IECC Energy Efficiency Certificate

Insulation Rating		R-Value	
Ceiling / Roof		0.00	
Wall		0.00	
Floor / Foundation		0.00	
Ductwork (unconditioned spaces)			
Glass & Door Rating		U Factor	SHGC
Window			
Door			
Heating & Cooling Equipment		Efficiency	
Water Heater			
Name		Date	
Comments:			

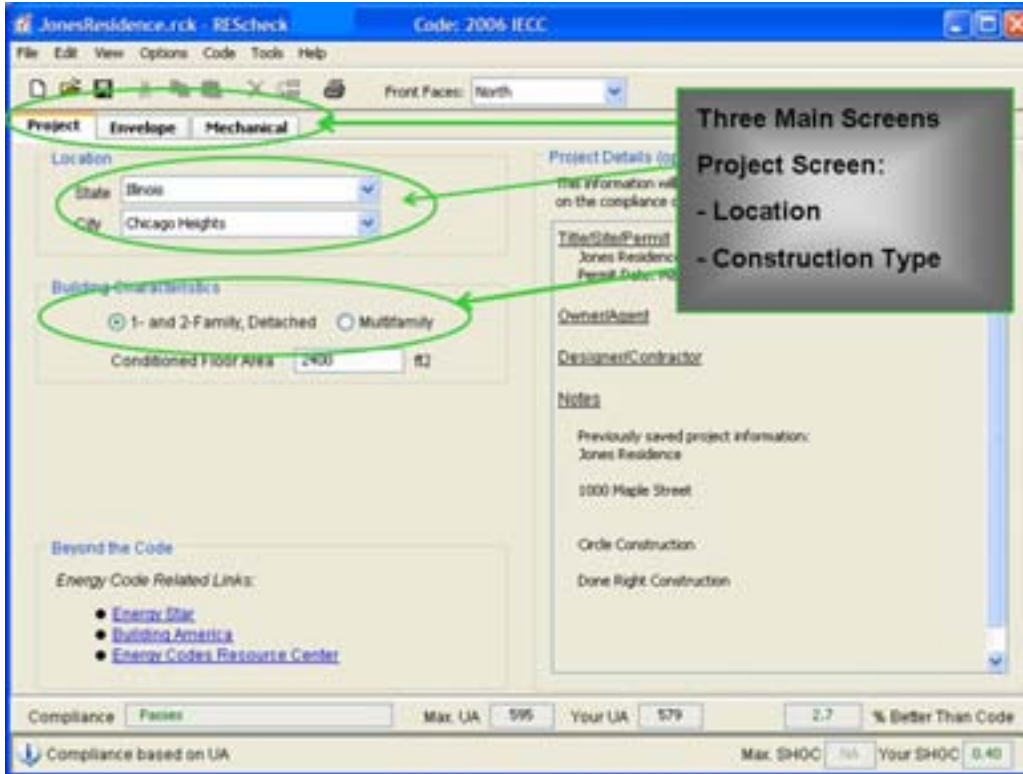
HVAC Trade-offs – slide 22

- REScheck is a “limited scope” performance analysis tool as permitted under Section 404.6.2
- Performance analysis is attempted only when:
 - House fails by UA compliance
 - High Efficiency HVAC equipment has been specified
- How this impacts REScheck
 - Requires users to initiate compliance check
 - Requires entry of orientation and SHGC
 - Doesn't always improve compliance even if high-efficiency HVAC is specified

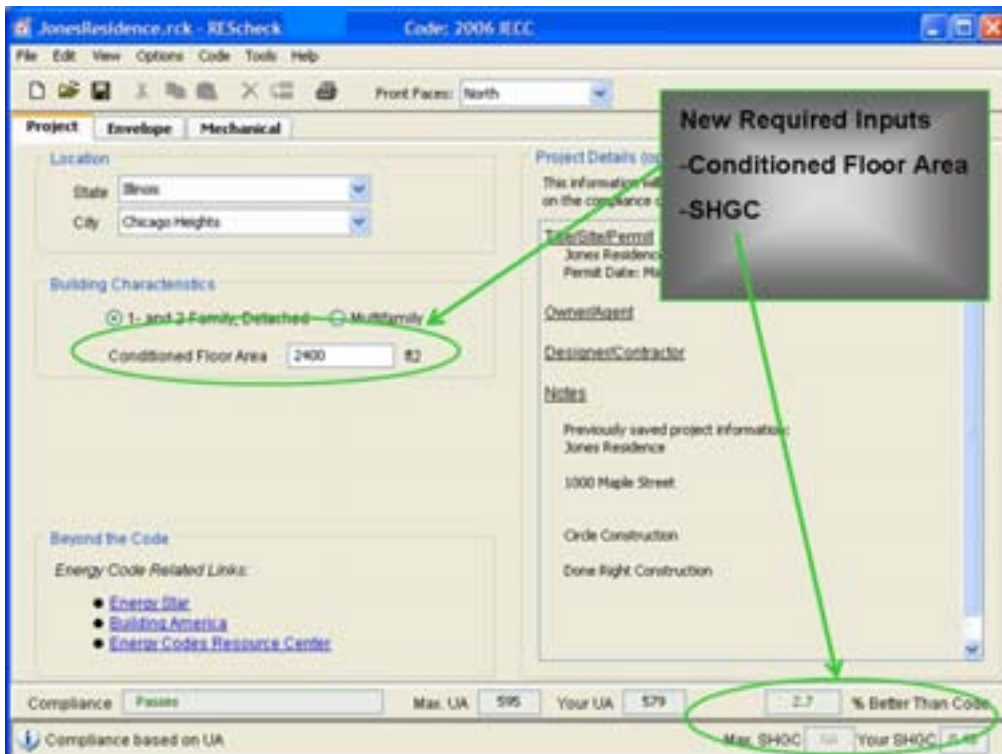
REScheck Loading Screen – slide 23



Main Screen – slide 24



New Required Inputs – slide 25



Envelope Section – slide 26

JonesResidence Code: 2003 IECC

File Edit View Options Code Tools Help

Front Faces: North

Project Envelope Mechanical

Ceiling Skylight Wall Window Door Basement Floor Crawl Wall

	Component	Assembly	Orientation	Gross Area or Slab Perimeter	Cavity Insulation R-Value	Continuity Insulation R-Value
Building						
1	Ceiling 1	All-Wood Joist/Rafter/Truss		2415	ft2 38.0	0
2	Exterior Wall				ft2 19.0	0
3	Door 1				ft2	
4	Window				ft2	

Building Components are added by clicking on these.

Below-Grade Walls in REScheck – slide 27

Basement Walls

Enter the specified dimensions in feet (not inches) in the boxes provided. A basement wall less than 50% below grade is considered an above-grade wall and must be entered using the Wall button.

Wall Height (ft)
Measured from the top of the wall to the basement floor.

Depth Below Grade (ft)
Measured from the finished outside grade to the basement floor.

Depth of Insulation (ft)
Measured from the top of the wall to where the insulation stops.

OK Cancel

Component	Assembly	Gross Area
Building		
1	Basement Wall 1	ft2

- Solid Concrete or Masonry
- Masonry Block with Empty Cells
- Masonry Block with Integral Insulation
- Wood Frame
- Insulated Concrete Forms
- Other

Crawspace Walls in REScheck – slide 28

Project		Envelope			Mechanical						
		Ceiling	Skylight	Wall	Window	Door	Basement	Floor	Crawl Wall		
Component	Assembly	Gross Area	Cavity Insulation R-Value	Continuous Insulation R-Value	U-Factor	UA	Wall Height (ft)	Depth Below Grade (ft)	Depth Insul (ft)		
Building											
1	Crawl 1	Build Concrete or Masonry	0	12	0.0	0.0	0.0	0	0.0	0.0	

Unventilated Crawl Space Walls

The crawl space wall option applies only to walls of unventilated crawl spaces. Enter the specified dimensions in feet (not inches) in the boxes provided.

Wall Height (ft)
Measured from the top of the wall to top of the footing.

Depth Below Grade (ft)
Measured from outside grade to the top of the footing.

Depth Below Inside Grade (ft)
Measured from inside grade to the top of the footing.

Depth of Insulation (ft)
Include the total vertical plus horizontal distance.

OK Cancel

Slabs in REScheck – slide 29

Project		Envelope			Mechanical						
		Ceiling	Skylight	Wall	Window	Door	Basement	Slab-On-Grade Floors			
Component	Assembly	Gross Area									
Building											
1	Floor 1	Click here to select Assn...	0	12							
		All-Wood Joist/Truss									
		Slab-On-Grade									
		Structural Insulated Panels									
		Other									
		Unheated									
		Heated									

Slab-On-Grade Floors

Enter the depth of the insulation (ft), including the total vertical and horizontal distance.

Horizontal Insulation (A + B = Insulation Depth)

Vertical Insulation (A = Insulation Depth)

OK Cancel

Help

- Depth of Insulation - Enter the depth (ft) of the insulation you intend to install as measured from the top of the slab to where the insulation stops. This distance should include the total vertical plus horizontal distance. Refer to the illustration below of acceptable configurations. If you enter a depth of 0, the program assumes no insulation is to be installed.

Mechanical Requirements in REScheck – slide 30

Use of this section is optional
 Only get “credit” for high-efficiency equipment

Software Help – slide 31



Setting the Standard Newsletter – slide 32

- Register on-line to receive the latest up-to-date information on energy code related issues

<http://www.energycodes.gov/news>

Building Energy Codes Website – slide 33

www.energycodes.gov
techsupport@becp.pnl.gov

Software Demo

Live Q&A