



U.S. Department of Energy

# Building Energy Codes



**REScheck™**

## **RESIDENTIAL PLAN REVIEW QUICK REFERENCE GUIDE**

Plan review for energy code compliance can be conducted quickly and efficiently. The U.S. Department of Energy's REScheck Compliance Software is designed to create simplified compliance certificates that can be easily reviewed by enforcement personnel. This Quick Reference Guide will guide you, step-by-step, through a typical plan review process. There are three basic steps for conducting a building energy code plan review:

- Step 1: Verify the documentation has been correctly prepared.
- Step 2: Verify the levels of efficiency shown on the plans meet or exceed that shown in the documentation.
- Step 3: Verify all of the information to conduct a field inspection is included in the plans or documentation for the inspector to use on site.

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### Code Compliance Responsibilities

Successful compliance requires the cooperation of many individuals involved in a building project: designers, engineers, architect, building owners, etc. Compliance also requires the efforts of certain individuals to whom the code gives specific responsibilities:

- Applicant
- Building Official
- Plans Examiner or Special Plans Examiner
- Inspector or Special Inspector

### Role of the Applicant

The applicant is the person named on the building permit. The applicant is ultimately responsible for meeting all requirements specific in the code. The applicant may be the owner, architect, engineer, contractor or any other authorized agent for the project owner who applies for the building permit.

### Role of the Building Official

The building official is typically responsible for enforcing all provisions of the code. To carry out code enforcement, the building official may appoint technical officers and inspectors.

### Role of the Plans Examiner or Special Plans Examiner

Plans examiners and Special Plans Examiners are typically responsible in verifying the plans for energy code compliance.

### Role of the Inspector or Special Inspector

Inspectors and Special Inspectors are responsible in conducting field inspections for energy code compliance.



Permit Number

Checked by/Date

**REScheck Compliance Certificate  
2003 IECC**

REScheck Software Version 3.6 Release 2  
Data filename: Q:\JonesResidence.rck

PROJECT TITLE: Jones Residence - Plan 3677

CITY: Chicago Heights  
STATE: Illinois  
HDD: 6541  
CONSTRUCTION TYPE: Single Family  
WINDOW / WALL RATIO: 0.18

DATE: 11/10/04  
DATE OF PLANS: March 15, 2005

PROJECT DESCRIPTION:  
Jones Residence  
1000 Maple Street

DESIGNER/CONTRACTOR:  
Done Right Construction

PROJECT NOTES:  
Plan 3677

COMPLIANCE: Passes  
Maximum UA = 714  
Your Home UA = 634  
11.2% Better Than Code (UA)

**Step One:** Verify the project information matches the information on the building plans. The code, city and state, and construction type will impact energy code compliance.

**Step Two:** Verify the project complies with the applicable code. The **Maximum UA** must be greater than or equal to the **Your Home UA** to demonstrate compliance

**Step Three:** Verify the **Gross Area or Perimeter** values represent the proposed house. Verify window area is correct by using rough opening as shown on the plans. Walls that separate conditioned from unconditioned spaces such as a garage, should be included in the wall area.

**Step Four:** Verify the insulation R-values shown on the building plans meet or exceed the values in the **Cavity R-value** and/or **Continuous R-Value** section. Verify the insulation will fit uncompressed in the framing cavity. Continuous R-values are for insulation installed over the face of framing.

Ceiling 1: All-Wood Joist/Rafter/Truss  
Exterior Wall 1: Wood Frame, 16" o.c.  
Door 1: Opaque  
Window main: Vinyl Frame, Double Pane  
Exterior Wall 2 South: Wood Frame, 16" o.c.  
Window 2: Vinyl Frame:Double Pane with Low-E  
Door 2: Solid  
Exterior Wall 3 East: Wood Frame, 16" o.c.  
Exterior Wall 4 West: Wood Frame, 16" o.c.  
Window 3: Vinyl Frame:Double Pane with Low-E  
Knee Wall West: Wood Frame, 16" o.c.  
Knee Wall East: Wood Frame, 16" o.c.

Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Glazing or Door U-Factor	UA
2415	38.0	0.0		72
911	19.0	0.0		30
40			0.500	20
369			0.400	148
834	19.0	0.0		39
149			0.400	60
40			0.500	20
492	19.0	0.0		30
632	19.0	0.0		37
15			0.400	6
69	19.0	0.0		4
84	19.0	0.0		5

**Step Five:** Verify the window and door U-factors shown on the building plans meet or exceed what is shown in the documentation.



	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Glazing or Door U-Factor	UA
Basement Wall 2: Solid Concrete or Masonry Wall height: 9.0' Depth below grade: 4.5' Insulation depth: 9.0'	144	19.0	0.0		8
Basement Wall 1: Solid Concrete or Masonry Wall height: 9.0' Depth below grade: 4.5' Insulation depth: 9.0'	216	19.0	0.0		11
Basement Wall 3: Solid Concrete or Masonry Wall height: 9.0' Depth below grade: 7.0' Insulation depth: 9.0'	684	19.0	0.0		32
Floor 1: All-Wood Joist/Truss, Over Unconditioned Space	783	19.0	0.0		37
Floor 2: Slab-On-Grade: Unheated Insulation depth: 2.0'	93		5.0		75

Furnace 1: Forced Hot Air, 90 AFUE  
Air Conditioner 1: Electric Central Air, 13 SEER

COMPLIANCE STATEMENT: The proposed building design described here is consistent with the building plans, specifications, and other calculations submitted with the permit application. The proposed building has been designed to meet the 2003 IECC requirements in REScheck Version 3.6 Release 2 (formerly MECcheck) and to comply with the mandatory requirements listed in the REScheck Inspection Checklist.

Builder/Designer \_\_\_\_\_ Date \_\_\_\_\_

**Step Six:** Verify the correct floor components that define the building envelope are shown. For example, a floor over a crawl that is vented to the outside; the crawl wall would not be part of the building envelope and should not be shown on the report.

Verify the slab-on-grade is entered in linear feet.

**Step Seven:** If a Furnace or Air Conditioner is called out in the documentation verify the rated efficiency of the system is called out on the plans.



# REScheck Inspection Checklist 2003 IECC

REScheck Software Version 3.6 Release 2  
DATE: 11/10/04  
PROJECT TITLE: Jones Residence - Plan 3677

**Step Eight:** Verify that the R-values and U-factors and efficiencies listed on the inspection form match the values listed in the preceding section. Include any comments to the inspectors in this section. Check the comments on each of the sections to ensure that they apply to the project.

Bldg. |  
Dept. |  
Use |

### Ceilings:

- [ ] 1. Ceiling 1: All-Wood Joist/Rafter/Truss, R-38.0 cavity insulation  
Comments: \_\_\_\_\_

### Above-Grade Walls:

- [ ] 1. Exterior Wall 1: Wood Frame, 16" o.c., R-19.0 cavity insulation  
Comments: \_\_\_\_\_
- [ ] 2. Exterior Wall 2 South: Wood Frame, 16" o.c., R-19.0 cavity insulation  
Comments: \_\_\_\_\_
- [ ] 3. Exterior Wall 3 East: Wood Frame, 16" o.c., R-19.0 cavity insulation  
Comments: \_\_\_\_\_
- [ ] 4. Exterior Wall 4 West: Wood Frame, 16" o.c., R-19.0 cavity insulation  
Comments: \_\_\_\_\_
- [ ] 5. Knee Wall West: Wood Frame, 16" o.c., R-19.0 cavity insulation  
Comments: \_\_\_\_\_
- [ ] 6. Knee Wall East: Wood Frame, 16" o.c., R-19.0 cavity insulation  
Comments: \_\_\_\_\_

### Basement Walls:

- [ ] 1. Basement Wall 2: Solid Concrete or Masonry, 9.0' ht/4.5' bg/9.0' insul,  
R-19.0 cavity insulation  
Comments: \_\_\_\_\_
- [ ] 2. Basement Wall 1: Solid Concrete or Masonry, 9.0' ht/4.5' bg/9.0' insul,  
R-19.0 cavity insulation  
Comments: \_\_\_\_\_
- [ ] 3. Basement Wall 3: Solid Concrete or Masonry, 9.0' ht/7.0' bg/9.0' insul,  
R-19.0 cavity insulation  
Comments: \_\_\_\_\_

### Windows:

- [ ] 1. Window main: Vinyl Frame, Double Pane, U-factor: 0.400  
For windows without labeled U-factors, describe features:  
# Panes\_\_\_\_ Frame Type\_\_\_\_\_ Thermal Break? [ ] Yes [ ] No  
Comments: \_\_\_\_\_
- [ ] 2. Window 2: Vinyl Frame:Double Pane with Low-E, U-factor: 0.400  
For windows without labeled U-factors, describe features:  
# Panes\_\_\_\_ Frame Type\_\_\_\_\_ Thermal Break? [ ] Yes [ ] No  
Comments: \_\_\_\_\_
- [ ] 3. Window 3: Vinyl Frame:Double Pane with Low-E, U-factor: 0.400  
For windows without labeled U-factors, describe features:  
# Panes\_\_\_\_ Frame Type\_\_\_\_\_ Thermal Break? [ ] Yes [ ] No  
Comments: \_\_\_\_\_

### Doors:

- [ ] 1. Door 1: Opaque, U-factor: 0.500  
Comments: \_\_\_\_\_
- [ ] 2. Door 2: Solid, U-factor: 0.500  
Comments: \_\_\_\_\_

### Floors:

- [ ] 1. Floor 1: All-Wood Joist/Truss, Over Unconditioned Space, R-19.0 cavity insulation  
Comments: \_\_\_\_\_
- [ ] 2. Floor 2: Slab-On-Grade:Unheated, 2.0' insulation depth,  
R-5.0 continuous insulation  
Comments: \_\_\_\_\_  
Slab insulation to extend down from the top of the slab to at least 2.0 ft. OR down to at least the bottom of the slab then horizontally for a total distance of 2.0 ft.  
Exterior insulation must have a rigid, opaque, weather-resistant protective covering that covers the exposed (above-grade) insulation and extends at least 6 in. below grade.

### Heating and Cooling Equipment:

- [ ] 1. Furnace 1: Forced Hot Air, 90 AFUE or higher  
Make and Model Number \_\_\_\_\_
- [ ] 2. Air Conditioner 1: Electric Central Air, 13 SEER or higher



- Air Leakage:**
- [ ] Joints, penetrations, and all other such openings in the building envelope that are sources of air leakage must be sealed.
  - [ ] Recessed lights must be 1) Type IC rated, or 2) installed inside an appropriate air-tight assembly with a 0.5" clearance from combustible materials. If non-IC rated, the fixture must be installed with a 3" clearance from insulation.

- Skylights:**
- [ ] Minimum insulation requirement for skylight shafts equal to or greater than 12 inches is R-19.

- Vapor Retarder:**
- [ ] Required on the warm-in-winter side of all non-vented framed ceilings, walls, and floors.

- Materials Identification:**
- [ ] Materials and equipment must be installed in accordance with the manufacturer's installation instructions.
  - [ ] Materials and equipment must be identified so that compliance can be determined.
  - [ ] Manufacturer manuals for all installed heating and cooling equipment and service water heating equipment must be provided.
  - [ ] Insulation R-values and glazing U-factors must be clearly marked on the building plans or specifications.

- Duct Insulation:**
- [ ] Supply ducts in unconditioned attics or outside the building must be insulated to R-8.
  - [ ] Return ducts in unconditioned attics or outside the building must be insulated to R-4.
  - [ ] Supply ducts in unconditioned spaces must be insulated to R-8.
  - [ ] Return ducts in unconditioned spaces (except basements) must be insulated to R-2.
  - [ ] Where exterior walls are used as plenums, the wall must be insulated to R-8.
  - [ ] Insulation is not required on return ducts in basements.

- Duct Construction:**
- [ ] Duct connections to flanges of air distribution system equipment must be sealed and mechanically fastened.
  - [ ] All joints, seams, and connections must be securely fastened with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric, or tapes. Tapes and mastics must be rated UL 181A or UL 181B.
  - [ ] *Exception:* Continuously welded and locking-type longitudinal joints and seams on ducts operating at less than 2 in. w.g. (500 Pa).
  - [ ] The HVAC system must provide a means for balancing air and water systems.

- Temperature Controls:**
- [ ] Thermostats are required for each separate HVAC system. A manual or automatic means to partially restrict or shut off the heating and/or cooling input to each zone or floor shall be provided.

- Service Water Heating:**
- [ ] Water heaters with vertical pipe risers must have a heat trap on both the inlet and outlet unless the water heater has an integral heat trap or is part of a circulating system.
  - [ ] Insulate circulating hot water pipes to the levels in Table 1.

- Circulating Hot Water Systems:**
- [ ] Insulate circulating hot water pipes to the levels in Table 1.

- Swimming Pools:**
- [ ] All heated swimming pools must have an on/off heater switch and require a cover unless over 20% of the heating energy is from non-depletable sources. Pool pumps require a time clock.

- Heating and Cooling Piping Insulation:**
- [ ] HVAC piping conveying fluids above 105 °F or chilled fluids below 55 °F must be insulated to the levels in Table 2.

Table 1: **Minimum Insulation Thickness for Circulating Hot Water Pipes.**

Heated Water Temperature ( F )	Insulation Thickness in Inches by Pipe Sizes			
	Non-Circulating Runouts		Circulating Mains and Runouts	
	Up to 1"	Up to 1.25"	1.5" to 2.0"	Over 2"
170-180	0.5	1.0	1.5	2.0
140-160	0.5	0.5	1.0	1.5
100-130	0.5	0.5	0.5	1.0

Table 2: **Minimum Insulation Thickness for HVAC Pipes.**

Piping System Types	Fluid Temp. Range ( F )	Insulation Thickness in Inches by Pipe Sizes			
		2" Runouts	1" and Less	1.25" to 2"	2.5" to 4"
<b>Heating Systems</b>					
Low Pressure/Temperature	201-250	1.0	1.5	1.5	2.0
Low Temperature	120-200	0.5	1.0	1.0	1.5



Steam Condensate (for feed water)	Any	1.0	1.0	1.5	2.0
<b>Cooling Systems</b>					
Chilled Water, Refrigerant, and Brine	40-55	0.5	0.5	0.75	1.0
	Below 40	1.0	1.0	1.5	1.5

