ZONE 5

Single-Family Prescriptive Packages

1998/2000 IECC

Step by Step Instructions

Step 1: Determine the glazing area %.

Step 2: The glazing area percentage is a maximum, so as long as any buildings built with the selected package have less than or equal to the listed glazing area percentage, the buildings will comply with the selected code. Each component requirement must be met within the selected package, otherwise select another package or use the **RES*check*™** software, which can calculate trade-offs for compliance.

Step 3: Complete the Prescriptive Package Worksheet available online at **www.energycodes.gov/rescheck/prescriptive.stm.**

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area %[1]	Glazing U-Factor[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	8%	0.90	R-19	R-11	R-11	R-5	—	R-6	Normal
2	12%	0.75	R-26	R-13	R-11	R-5	—	R-6	Normal
3	12%	0.65	R-19	R-13	R-11	R-5	—	R-5	Normal
4	15%	0.75	R-38	R-11	R-19	R-8	R-2	R-10	Normal
5	15%	0.65	R-30	R-13	R-11	R-5	—	R-6	Normal
6	18%	0.65	R-30	R-13	R-19	R-8	R-2	R-10	Normal
7	18%	0.55	R-30	R-13	R-11	R-5	—	R-6	Normal
8	20%	0.52	R-38	R-13	R-11	R-5	—	R-6	Normal
9	25%	0.50	R-38	R-13	R-19	R-8	—	R-10	Normal
10	25%	0.40	R-26	R-13	R-11	R-5	—	R-6	Normal
11	12%	0.90	R-19	R-11	R-11	R-4	—	R-5	High Heating
12	15%	0.90	R-26	R-13	R-11	R-5	—	R-6	High Heating
13	18%	0.75	R-19	R-13	R-13	R-6	—	R-8	High Heating
14	25%	0.60	R-26	R-13	R-13	R-6	—	R-8	High Heating
15	12%	0.90	R-26	R-13	R-13	R-5	—	R-6	High Cooling
16	15%	0.75	R-26	R-13	R-13	R-6	—	R-7	High Cooling
17	18%	0.70	R-26	R-13	R-19	R-7	R-2	R-10	High Cooling
18	18%	0.60	R-30	R-11	R-11	R-5	—	R-6	High Cooling
19	25%	0.55	R-30	R-13	R-19	R-8	R-2	R-11	High Cooling
20	25%	0.45	R-30	R-11	R-11	R-5	—	R-6	High Cooling
21	12%	any	R-19	R-11	R-11	R-4	—	R-5	High Heat/Cool
22	15%	0.90	R-19	R-11	R-11	R-5	—	R-5	High Heat/Cool
23	18%	0.75	R-19	R-11	R-11	R-4	—	R-5	High Heat/Cool
24	25%	0.65	R-26	R-11	R-13	R-6	—	R-7	High Heat/Cool

Footnotes

1. **Glazing Area** is the ratio of the area of the glazing assemblies (including sliding-glass doors, skylights, and basement windows but excluding opaque doors) to the gross wall area, expressed as a percentage. The nominal area or rough opening is acceptable for flat windows. Up to 1% of the total allowed glazing area may be excluded from the U-factor requirement. For example, 3 ft^2 of decorative glass may be excluded from a building design with 300 ft^2 of glazing area.

2. **Glazing U-Factors** must be tested and documented by the manufacturer in accordance with the National Fenestration Rating Council (NFRC) test procedure or taken from the glazing U-factor table in Appendix B of the Prescriptive Packages User's Guide located at **www.energycodes.gov**. Center-of-glass U-factors cannot be used.

3. The **Ceiling R-values** do not assume a raised or oversized truss construction. If the insulation achieves the full insulation thickness over the plate lines of exterior walls, R-30 insulation may be substituted for R-38 insulation. Ceiling R-values represent the sum of cavity insulation plus insulating sheathing (if used). For ventilated ceilings, insulating sheathing must be placed between the conditioned space and the ventilated portion of the roof.

4. **Wall R-Values** represent the sum of the wall cavity insulation plus insulating sheathing (if used). Do not include R-values for air films, exterior siding, "housewraps", structural sheathing, or interior drywall. For example, an R-19 requirement could be met EITHER by R-19 cavity insulation OR R-13 cavity insulation plus R-6 insulating sheathing. Wall requirements apply to wood-frame wall constructions. Metal-frame wall or mass (concrete, masonry, log) wall equivalent R-values can be found in the Prescriptive Packages User's Guide located at **www.energycodes.gov**.

5. The **Floor R-Value** requirements apply to floors over unconditioned spaces (such as unconditioned crawlspaces, basements, or garages). Floors over outside air (such as cantilevers, bay windows, etc.) must meet the ceiling requirements.

6. **Basement Wall R-Values** apply to walls of conditioned basements below uninsulated floors and must be insulated from the top of the basement wall to a depth of 10 ft below grade or to the level of the basement floor, whichever is less. The entire opaque portion of any individual basement wall with an average depth less than 50% below grade must meet the same R-value requirement as above-grade walls. Windows and sliding glass doors of conditioned basements must be included with the other glazing.

7. The **Slab Perimeter R-Value** requirements are for unheated slabs. Add an additional R-2 for heated slabs. For packages with a slab insulation requirement, the insulation must extend a total linear distance of at least 24 in. in Zones 2-12. The insulation must extend: 1) down from the top of the slab, or 2) down from the top of the slab to the bottom of the slab and then horizontally underneath the slab, or 3) down from the top of the slab to the bottom of the slab and then horizontally away from the slab, with pavement or at least 10 in. of soil covering the horizontal insulation. Exterior exposed insulation shall be protected.

8. The **Crawl Space Wall R-Value** requirements are for walls of unventilated crawl spaces. The crawl space wall insulation must extend from the top of the wall (including the rim joist and sill plate) to at least 12 in. below the outside finished grade. If the distance from the outside finished grade to the top of the footing is less than 12 in., the insulation must extend a total vertical plus horizontal distance of 24 in. from the outside finished grade.

9. Normal refers to the efficiency requirements according to the National Appliance Energy Conservation Act (NAECA). It represents the minimum equipment efficiency which can be legally sold in the U.S. **High Heating** means a furnace AFUE of 90% or more, or a heat pump HSPF of 7.8 or more. **High Cooling** means a SEER of 12 or more. **High Heat/Cool** means both heating and cooling equipment must meet these minimum efficiencies. If you plan to install more than one piece of heating equipment or more than one piece of cooling equipment, the equipment with the lowest efficiency must meet or exceed the efficiency required by the selected package.

Notes:

The maximum **Door U-factor** is 0.35 for solid doors. One door may be excluded from this requirement. If a door contains glass and an aggregate U-factor is not available, include the glass area with your glazing and use the non-glazed door U-factor table in Appendix B of the Prescriptive Packages User's Guide located at **www.energycodes.gov**.

RES*check*™

3 simple ways to demonstrate compliance with the MEC or the IECC. **RES*check*** can be used when adopting authority has approved its use.

1. **Prescriptive approach** - allows builders or designers to select from various combinations of energy conservation measures based on "climate zone" location. Maps and prescriptive packages can be downloaded at **www.energycodes.gov/rescheck/packages_iecc.stm**
2. **Trade-off worksheet approach** - enables builders to vary insulation levels in the ceiling, wall, floor, basement wall, slab-edge and crawl space; glazing and door areas; and glazing and door U-factor.
3. **Software approach** – completes the same calculations as the trade-off worksheet but automates the procedure using Windows-based software.

FREE RES*check* Downloads: www.energycodes.gov/rescheck/download.stm

Air Leakage

All penetrations to the building envelope must be sealed, caulked, gasketed, weatherstripped or otherwise sealed. This includes, but is not limited to, areas around windows, doors, HVAC ductwork, plumbing pipe, electrical penetrations, etc. Recessed lights must meet one of the following conditions:

- **Type IC** rated with no penetrations between the inside of the fixture and ceiling cavity.
- **Type IC or non-IC** rated and installed in a sealed box constructed from 1/2" gypsum wallboard or other approved assembly.
- **Type IC** rated, tested and labeled as to being "airtight".

Solar Heat Gain Coefficient (SHGC)

The area-weighted average SHGC of all windows, glazed doors and skylights must not exceed 0.4. The SHGC measures how well a product blocks heat caused by sunlight and is usually listed in manufacturer's data or on the National Fenestration Rating Council (NFRC) label affixed to the window.

Service Water Heating

Water heaters with pipe risers shall have heat traps on both the inlet and outlet of the water heater unless the water heater has integral heat traps or is part of a circulating system. Typical methods used for creating heat traps are "U" or "rams horn" bends in the flexible pipe connectors or installing aftermarket pipe nipples with integral traps.

Duct Insulation

RES*check* duct insulation values are based on the more stringent of the heating or cooling degree day requirement. Supply and return-air ducts located within crawlspaces, uninsulated basements, attics and framed wall cavities must be insulated to R-5.0. Ductwork located on the exterior of the building must be insulated to R-8.

Duct Construction

All joints, seams and connections must be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded fabric or approved tapes. Standard duct tape is not permitted.

Temperature Controls

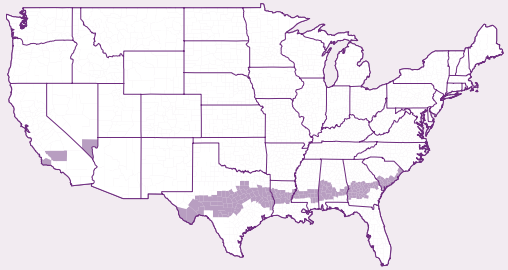
Thermostats must be capable of being set down to 55°F or lower for heating and up to 85°F or more for cooling. Thermostats for both heating and cooling must have a deadband (temperature range where no heating or cooling takes place) of at least 5°F. Heat pumps require a thermostat capable of preventing back-up heat from operating when the heating requirements can be met by the heat pump alone.

Swimming Pools

All heated pools must have an "on/off" pool heater switch and be equipped with a pool cover. All swimming pool pumps must be equipped with time clocks.

Printed with renewable – source ink on paper containing at least 50% waste-paper, including 20% post consumer waste. January 2003

RES*check*™



Zone 5

(HDD Range is 2000-2499)

Prescriptive Package Requirements

BUILDING ENERGY CODES

ZONE 12

Single-Family Prescriptive Packages

1998/2000 IECC

Step by Step Instructions

Step 1: Determine the glazing area %.

Step 2: The glazing area percentage is a maximum, so as long as any buildings built with the selected package have less than or equal to the listed glazing area percentage, the buildings will comply with the selected code. Each component requirement must be met within the selected package, otherwise select another package or use the **RES*check***™ software, which can calculate trade-offs for compliance.

Step 3: Complete the Prescriptive Package Worksheet available online at **www.energycodes.gov/rescheck/prescriptive.stm.**

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area %[1]	Glazing U-Factor[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	8%	0.45	R-38	R-13	R-19	R-9	R-7	R-16	Normal
2	12%	0.50	R-38	R-19	R-21	R-10	—	R-19	Normal
3	12%	0.45	R-38	R-17	R-19	R-9	R-6	R-16	Normal
4	12%	0.40	R-38	R-18	R-15	R-8	R-2	R-11	Normal
5	15%	0.50	R-49	R-19	R-30	R-14	—	—	Normal
6	15%	0.40	R-49	R-17	R-19	R-10	R-7	R-17	Normal
7	15%	0.40	R-38	R-18	R-21	R-10	R-9	R-19	Normal
8	18%	0.40	R-38	R-18	R-30	R-14	—	—	Normal
9	18%	0.37	R-38	R-19	R-19	R-10	R-8	R-17	Normal
10	20%	0.33	R-49	R-20	R-19	R-10	R-7	R-17	Normal
11	22%	0.35	R-38	R-21	R-30	R-14	—	—	Normal
12	25%	0.27	R-38	R-19	R-21	R-10	–	R-22	Normal
13	12%	0.70	R-38	R-19	R-13	R-7	R-2	R-11	High Heating
14	12%	0.60	R-30	R-13	R-19	R-9	R-2	R-19	High Heating
15	15%	0.60	R-38	R-19	R-15	R-7	R-2	R-13	High Heating
16	15%	0.45	R-38	R-13	R-13	R-7	R-2	R-11	High Heating
17	18%	0.55	R-38	R-18	R-19	R-9	R-3	R-22	High Heating
18	18%	0.40	R-38	R-13	R-15	R-7	R-2	R-12	High Heating
19	22%	0.45	R-38	R-17	R-19	R-9	R-2	R-22	High Heating
20	22%	0.40	R-49	R-13	R-19	R-9	R-2	R-22	High Heating
21	12%	0.70	R-38	R-15	R-19	R-9	R-2	R-20	High Heat/Cool
22	12%	0.55	R-30	R-13	R-15	R-7	R-2	R-12	High Heat/Cool
23	15%	0.60	R-38	R-15	R-21	R-10	R-3	R-28	High Heat/Cool
24	15%	0.50	R-26	R-13	R-19	R-9	R-2	R-22	High Heat/Cool
25	18%	0.55	R-38	R-17	R-19	R-9	R-2	R-22	High Heat/Cool
26	18%	0.45	R-30	R-13	R-19	R-9	R-2	R-22	High Heat/Cool
27	22%	0.50	R-49	R-18	R-21	R-10	R-4	R-28	High Heat/Cool
28	22%	0.40	R-38	R-13	R-19	R-9	R-2	R-22	High Heat/Cool

Footnotes

1. **Glazing Area** is the ratio of the area of the glazing assemblies (including sliding-glass doors, skylights, and basement windows but excluding opaque doors) to the gross wall area, expressed as a percentage. The nominal area or rough opening is acceptable for flat windows. Up to 1% of the total allowed glazing area may be excluded from the U-factor requirement. For example, 3 ft^2 of decorative glass may be excluded from a building design with 300 ft^2 of glazing area.

2. **Glazing U-Factors** must be tested and documented by the manufacturer in accordance with the National Fenestration Rating Council (NFRC) test procedure or taken from the glazing U-factor table in Appendix B of the Prescriptive Packages User's Guide located at **www.energycodes.gov**. Center-of-glass U-factors cannot be used.

3. The **Ceiling R-values** do not assume a raised or oversized truss construction. If the insulation achieves the full insualtion thickness over the plate lines of exterior walls, R-30 insulation may be substituted for R-38 insulation. R-38 insulation may be substituted for R-49 insulation. Ceiling R-values represent the sum of cavity insulation plus insulating sheathing (if used). For ventilated ceilings, insulating sheathing must be placed between the conditioned space and the ventilated portion of the roof.

4. **Wall R-Values** represent the sum of the wall cavity insulation plus insulating sheathing (if used). Do not include R-values for air films, exterior siding, "housewraps", structural sheathing, or interior drywall. For example, an R-19 requirement could be met EITHER by R-19 cavity insulation OR R-13 cavity insulation plus R-6 insulating sheathing. Wall requirements apply to wood-frame wall constructions. Metal-frame wall or mass (concrete, masonry, log) wall equivalent R-values can be found in the Prescriptive Packages User's Guide located at **www.energycodes.gov**.

5. The **Floor R-Value** requirements apply to floors over unconditioned spaces (such as unconditioned crawlspaces, basements, or garages). Floors over outside air (such as cantilevers, bay windows, etc.) must meet the ceiling requirements.

6. **Basement Wall R-Values** apply to walls of conditioned basements below uninsulated floors and must be insulated from the top of the basement wall to a depth of 10 ft below grade or to the level of the basement floor, whichever is less. The entire opaque portion of any individual basement wall with an average depth less than 50% below grade must meet the same R-value requirement as above-grade walls. Windows and sliding glass doors of conditioned basements must be included with the other glazing.

7. The **Slab Perimeter R-Value** requirements are for unheated slabs. Add an additional R-2 for heated slabs. For packages with a slab insulation requirement, the insulation must extend a total linear distance of at least 24 in. in Zones 2-12. The insulation must extend: 1) down from the top of the slab, or 2) down from the top of the slab to the bottom of the slab and then horizontally underneath the slab, or 3) down from the top of the slab to the bottom of the slab and then horizontally away from the slab, with pavement or at least 10 in. of soil covering the horizontal insulation. Exterior exposed insulation shall be protected.

8. The **Crawl Space Wall R-Value** requirements are for walls of unventilated crawl spaces. The crawl space wall insulation must extend from the top of the wall (including the rim joist and sill plate) to at least 12 in. below the outside finished grade. If the distance from the outside finished grade to the top of the footing is less than 12 in., the insulation must extend a total vertical plus horizontal distance of 24 in. from the outside finished grade.

9. Normal refers to the efficiency requirements according to the National Appliance Energy Conservation Act (NAECA). It represents the minimum equipment efficiency which can be legally sold in the U.S. **High Heating** means a furnace AFUE of 90% or more, or a heat pump HSPF of 7.8 or more. **High Cooling** means a SEER of 12 or more. **High Heat/Cool** means both heating and cooling equipment must meet these minimum efficiencies. If you plan to install more than one piece of heating equipment or more than one piece of cooling equipment, the equipment with the lowest efficiency must meet or exceed the efficiency required by the selected package.

Notes:

The maximum **Door U-factor** is 0.35 for solid doors. One door may be excluded from this requirement. If a door contains glass and an aggregate U-factor is not available, include the glass area with your glazing and use the non-glazed door U-factor table in Appendix B of the Prescriptive Packages User's Guide located at **www.energycodes.gov**.

RES*check*™

3 simple ways to demonstrate compliance with the MEC or the IECC. **RES*check*** can be used when adopting authority has approved its use.

1. **Prescriptive approach** - allows builders or designers to select from various combinations of energy conservation measures based on "climate zone" location. Maps and prescriptive packages can be downloaded at **www.energycodes.gov/rescheck/packages_iecc.stm**
2. **Trade-off worksheet approach** - enables builders to vary insulation levels in the ceiling, wall, floor, basement wall, slab-edge and crawl space; glazing and door areas; and glazing and door U-factor.
3. **Software approach** – completes the same calculations as the trade-off worksheet but automates the procedure using Windows-based software.

FREE RES*check* Downloads: www.energycodes.gov/rescheck/download.stm

Air Leakage

All penetrations to the building envelope must be sealed, caulked, gasketed, weatherstripped or otherwise sealed. This includes, but is not limited to, areas around windows, doors, HVAC ductwork, plumbing pipe, electrical penetrations, etc. Recessed lights must meet one of the following conditions:

- **Type IC** rated with no penetrations between the inside of the fixture and ceiling cavity.
- **Type IC or non-IC** rated and installed in a sealed box constructed from 1/2" gypsum wallboard or other approved assembly.
- **Type IC** rated, tested and labeled as to being "airtight".

Vapor Retarders

Vapor retarders (with a maximum perm rating of 1.0) must be installed on the "warm-in-winter" side of all non-vented framed ceilings, walls and floors. Typical methods used are: Kraft-faced insulation, polyethylene sheeting and vapor retarder primers/paints.

Service Water Heating

Water heaters with pipe risers shall have heat traps on both the inlet and outlet of the water heater unless the water heater has integral heat traps or is part of a circulating system. Typical methods used for creating heat traps are "U" or "rams horn" bends in the flexible pipe connectors or installing aftermarket pipe nipples with integral traps.

Duct Insulation

RES*check* duct insulation values are based on the more stringent of the heating or cooling degree day requirement. Supply and return-air ducts located within crawlspaces, uninsulated basements, attics and framed wall cavities must be insulated to R-5.0. Ductwork located on the exterior of the building must be insulated to R-8.

Duct Construction

All joints, seams and connections must be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded fabric or approved tapes. Standard duct tape is not permitted.

Temperature Controls

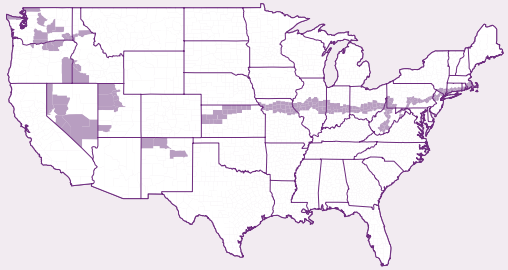
Thermostats must be capable of being set down to 55°F or lower for heating and up to 85°F or more for cooling. Thermostats for both heating and cooling must have a deadband (temperature range where no heating or cooling takes place) of at least 5°F. Heat pumps require a thermostat capable of preventing back-up heat from operating when the heating requirements can be met by the heat pump alone.

Swimming Pools

All heated pools must have an "on/off" pool heater switch and be equipped with a pool cover. All swimming pool pumps must be equipped with time clocks.

Printed with renewable – source ink on paper containing at least 50% waste-paper, including 20% post consumer waste. January 2003

RES*check*™



Zone 12

(HDD Range is 5500-5999)

Prescriptive Package Requirements

BUILDING ENERGY CODES

ZONE 13

Single-Family Prescriptive Packages

1998/2000 IECC

Step by Step Instructions

Step 1: Determine the glazing area %.

Step 2: The glazing area percentage is a maximum, so as long as any buildings built with the selected package have less than or equal to the listed glazing area percentage, the buildings will comply with the selected code. Each component requirement must be met within the selected package, otherwise select another package or use the **RES*check*™** software, which can calculate trade-offs for compliance.

Step 3: Complete the Prescriptive Package Worksheet available online at **www.energycodes.gov/rescheck/prescriptive.stm.**

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area %[1]	Glazing U-Factor[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	8%	0.45	R-38	R-16	R-19	R-10	R-7	R-16	Normal
2	12%	0.45	R-49	R-18	R-21	R-10	R-9	R-19	Normal
3	12%	0.40	R-38	R-18	R-19	R-10	R-6	R-16	Normal
4	15%	0.45	R-49	R-19	R-30	R-14	—	—	Normal
5	15%	0.35	R-38	R-18	R-21	R-10	R-9	R-20	Normal
6	18%	0.34	R-49	R-22	R-19	R-10	R-8	R-17	Normal
7	20%	0.31	R-49	R-24	R-19	R-10	R-7	R-17	Normal
8	22%	0.35	R-49	R-26	R-30	R-14	—	—	Normal
9	25%	0.25	R-49	R-19	R-21	R-10	R-9	R-20	Normal
10	12%	0.60	R-30	R-13	R-26	R-11	R-8	—	High Heating
11	12%	0.45	R-26	R-13	R-15	R-8	R-2	R-14	High Heating
12	15%	0.55	R-38	R-16	R-19	R-8	R-3	R-18	High Heating
13	15%	0.45	R-30	R-13	R-19	R-9	R-4	R-22	High Heating
14	18%	0.50	R-38	R-18	R-19	R-9	R-4	R-22	High Heating
15	18%	0.40	R-38	R-13	R-19	R-9	R-3	R-19	High Heating
16	22%	0.45	R-49	R-18	R-21	R-10	R-6	R-30	High Heating
17	22%	0.35	R-38	R-13	R-19	R-9	R-4	R-22	High Heating
18	12%	0.65	R-38	R-16	R-15	R-8	R-2	R-14	High Heat/Cool
19	12%	0.50	R-30	R-11	R-19	R-9	R-3	R-20	High Heat/Cool
20	15%	0.60	R-38	R-18	R-19	R-9	R-3	R-22	High Heat/Cool
21	15%	0.45	R-30	R-13	R-19	R-9	R-3	R-20	High Heat/Cool
22	18%	0.55	R-38	R-17	R-26	R-11	R-9	—	High Heat/Cool
23	18%	0.45	R-38	R-13	R-26	R-10	R-6	—	High Heat/Cool
24	22%	0.45	R-49	R-19	R-19	R-9	R-4	R-22	High Heat/Cool
25	22%	0.35	R-38	R-11	R-21	R-10	R-5	R-30	High Heat/Cool

Footnotes

1. **Glazing Area** is the ratio of the area of the glazing assemblies (including sliding-glass doors, skylights, and basement windows but excluding opaque doors) to the gross wall area, expressed as a percentage. The nominal area or rough opening is acceptable for flat windows. Up to 1% of the total allowed glazing area may be excluded from the U-factor requirement. For example, 3 ft^2 of decorative glass may be excluded from a building design with 300 ft^2 of glazing area.

2. **Glazing U-Factors** must be tested and documented by the manufacturer in accordance with the National Fenestration Rating Council (NFRC) test procedure or taken from the glazing U-factor table in Appendix B of the Prescriptive Packages User's Guide located at **www.energycodes.gov**. Center-of-glass U-factors cannot be used.

3. The **Ceiling R-values** do not assume a raised or oversized truss construction. If the insulation achieves the full insualtion thickness over the plate lines of exterior walls, R-30 insulation may be substituted for R-38 insulation. R-38 insulation may be substituted for R-49 insulation. Ceiling R-values represent the sum of cavity insulation plus insulating sheathing (if used). For ventilated ceilings, insulating sheathing must be placed between the conditioned space and the ventilated portion of the roof.

4. **Wall R-Values** represent the sum of the wall cavity insulation plus insulating sheathing (if used). Do not include R-values for air films, exterior siding, "housewraps", structural sheathing, or interior drywall. For example, an R-19 requirement could be met EITHER by R-19 cavity insulation OR R-13 cavity insulation plus R-6 insulating sheathing. Wall requirements apply to wood-frame wall constructions. Metal-frame wall or mass (concrete, masonry, log) wall equivalent R-values can be found in the Prescriptive Packages User's Guide located at **www.energycodes.gov**.

5. The **Floor R-Value** requirements apply to floors over unconditioned spaces (such as unconditioned crawlspaces, basements, or garages). Floors over outside air (such as cantilevers, bay windows, etc.) must meet the ceiling requirements.

6. **Basement Wall R-Values** apply to walls of conditioned basements below uninsulated floors and must be insulated from the top of the basement wall to a depth of 10 ft below grade or to the level of the basement floor, whichever is less. The entire opaque portion of any individual basement wall with an average depth less than 50% below grade must meet the same R-value requirement as above-grade walls. Windows and sliding glass doors of conditioned basements must be included with the other glazing.

7. The **Slab Perimeter R-Value** requirements are for unheated slabs. Add an additional R-2 for heated slabs. For packages with a slab insulation requirement, the insulation must extend a total linear distance of at least 48 in. in Zones 13-15. The insulation must extend: 1) down from the top of the slab, or 2) down from the top of the slab to the bottom of the slab and then horizontally underneath the slab, or 3) down from the top of the slab to the bottom of the slab and then horizontally away from the slab, with pavement or at least 10 in. of soil covering the horizontal insulation. Exterior exposed insulation shall be protected.

8. The **Crawl Space Wall R-Value** requirements are for walls of unventilated crawl spaces. The crawl space wall insulation must extend from the top of the wall (including the rim joist and sill plate) to at least 12 in. below the outside finished grade. If the distance from the outside finished grade to the top of the footing is less than 12 in., the insulation must extend a total vertical plus horizontal distance of 24 in. from the outside finished grade.

9. Normal refers to the efficiency requirements according to the National Appliance Energy Conservation Act (NAECA). It represents the minimum equipment efficiency which can be legally sold in the U.S. **High Heating** means a furnace AFUE of 90% or more, or a heat pump HSPF of 7.8 or more. **High Cooling** means a SEER of 12 or more. **High Heat/Cool** means both heating and cooling equipment must meet these minimum efficiencies. If you plan to install more than one piece of heating equipment or more than one piece of cooling equipment, the equipment with the lowest efficiency must meet or exceed the efficiency required by the selected package.

Notes:

The maximum **Door U-factor** is 0.35 for solid doors. One door may be excluded from this requirement. If a door contains glass and an aggregate U-factor is not available, include the glass area with your glazing and use the non-glazed door U-factor table in Appendix B of the Prescriptive Packages User's Guide located at **www.energycodes.gov**.

RES*check*™

3 simple ways to demonstrate compliance with the MEC or the IECC. **RES*check*** can be used when adopting authority has approved its use.

1. **Prescriptive approach** - allows builders or designers to select from various combinations of energy conservation measures based on "climate zone" location. Maps and prescriptive packages can be downloaded at **www.energycodes.gov/rescheck/packages_iecc.stm**
2. **Trade-off worksheet approach** - enables builders to vary insulation levels in the ceiling, wall, floor, basement wall, slab-edge and crawl space; glazing and door areas; and glazing and door U-factor.
3. **Software approach** – completes the same calculations as the trade-off worksheet but automates the procedure using Windows-based software.

FREE RES*check* Downloads: www.energycodes.gov/rescheck/download.stm

Air Leakage

All penetrations to the building envelope must be sealed, caulked, gasketed, weatherstripped or otherwise sealed. This includes, but is not limited to, areas around windows, doors, HVAC ductwork, plumbing pipe, electrical penetrations, etc. Recessed lights must meet one of the following conditions:

- **Type IC** rated with no penetrations between the inside of the fixture and ceiling cavity.
- **Type IC or non-IC** rated and installed in a sealed box constructed from 1/2" gypsum wallboard or other approved assembly.
- **Type IC** rated, tested and labeled as to being "airtight".

Vapor Retarders

Vapor retarders (with a maximum perm rating of 1.0) must be installed on the "warm-in-winter" side of all non-vented framed ceilings, walls and floors. Typical methods used are: Kraft-faced insulation, polyethylene sheeting and vapor retarder primers/paints.

Service Water Heating

Water heaters with pipe risers shall have heat traps on both the inlet and outlet of the water heater unless the water heater has integral heat traps or is part of a circulating system. Typical methods used for creating heat traps are "U" or "rams horn" bends in the flexible pipe connectors or installing aftermarket pipe nipples with integral traps.

Duct Insulation

RES*check* duct insulation values are based on the more stringent of the heating or cooling degree day requirement. Supply and return-air ducts located within crawlspaces, uninsulated basements, attics and framed wall cavities must be insulated to R-5.0. Ductwork located on the exterior of the building must be insulated to R-8.

Duct Construction

All joints, seams and connections must be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded fabric or approved tapes. Standard duct tape is not permitted.

Temperature Controls

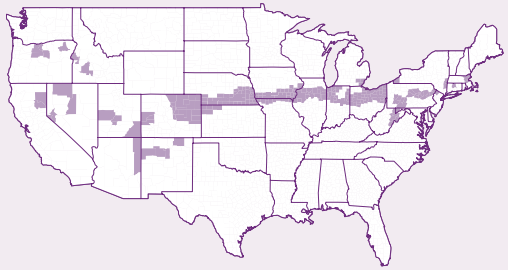
Thermostats must be capable of being set down to 55°F or lower for heating and up to 85°F or more for cooling. Thermostats for both heating and cooling must have a deadband (temperature range where no heating or cooling takes place) of at least 5°F. Heat pumps require a thermostat capable of preventing back-up heat from operating when the heating requirements can be met by the heat pump alone.

Swimming Pools

All heated pools must have an "on/off" pool heater switch and be equipped with a pool cover. All swimming pool pumps must be equipped with time clocks.

Printed with renewable – source ink on paper containing at least 50% waste-paper, including 20% post consumer waste. January 2003

RES*check*™



Zone 13

(HDD Range is 6000-6499)

Prescriptive Package Requirements

BUILDING ENERGY CODES

ZONE 15

Single-Family Prescriptive Packages

1998/2000 IECC

Step by Step Instructions

Step 1: Determine the glazing area %.

Step 2: The glazing area percentage is a maximum, so as long as any buildings built with the selected package have less than or equal to the listed glazing area percentage, the buildings will comply with the selected code. Each component requirement must be met within the selected package, otherwise select another package or use the **RES*check***™ software, which can calculate trade-offs for compliance.

Step 3: Complete the Prescriptive Package Worksheet available online at **www.energycodes.gov/rescheck/prescriptive.stm.**

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area %[1]	Glazing U-Factor[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	8%	0.42	R-38	R-16	R-19	R-11	R-8	R-16	Normal
2	12%	0.40	R-49	R-21	R-19	R-10	R-9	R-17	Normal
3	12%	0.40	R-38	R-21	R-21	R-11	R-13	R-22	Normal
4	12%	0.35	R-38	R-19	R-19	R-10	R-8	R-17	Normal
5	15%	0.35	R-49	R-21	R-21	R-11	R-13	R-20	Normal
6	15%	0.30	R-49	R-18	R-19	R-10	R-8	R-16	Normal
7	18%	0.35	R-49	R-21	R-30	R-15	—	—	Normal
8	18%	0.33	R-49	R-25	R-30	R-15	–	R-25	Normal
9	18%	0.30	R-38	R-19	R-26	R-14	—	—	Normal
10	20%	0.30	R-49	R-26	R-21	R-11	R-12	R-19	Normal
11	22%	0.30	R-49	R-22	R-30	R-15	—	—	Normal
12	25%	0.25	R-49	R-19	R-30	R-15	–	–	Normal
13	12%	0.65	R-38	R-18	R-19	R-10	R-4	R-22	High Heating
14	12%	0.50	R-38	R-13	R-19	R-9	R-4	R-20	High Heating
15	15%	0.55	R-38	R-17	R-21	R-11	R-7	—	High Heating
16	15%	0.40	R-38	R-13	R-19	R-9	R-3	R-18	High Heating
17	18%	0.50	R-49	R-19	R-21	R-11	R-7	R-28	High Heating
18	18%	0.40	R-38	R-17	R-15	R-8	R-2	R-14	High Heating
19	22%	0.40	R-38	R-19	R-21	R-11	R-6	R-28	High Heating
20	22%	0.35	R-38	R-13	R-26	R-12	R-13	—	High Heating
21	12%	0.65	R-38	R-17	R-19	R-10	R-4	R-22	High Heat/Cool
22	12%	0.50	R-38	R-13	R-19	R-9	R-3	R-19	High Heat/Cool
23	15%	0.55	R-38	R-19	R-19	R-10	R-4	R-22	High Heat/Cool
24	15%	0.45	R-38	R-13	R-21	R-11	R-6	R-28	High Heat/Cool
25	18%	0.45	R-38	R-17	R-19	R-10	R-4	R-22	High Heat/Cool
26	18%	0.40	R-38	R-13	R-26	R-11	R-8	—	High Heat/Cool
27	22%	0.40	R-49	R-18	R-19	R-10	R-4	R-22	High Heat/Cool
28	22%	0.35	R-49	R-15	R-19	R-10	R-4	R-22	High Heat/Cool

Footnotes

1. **Glazing Area** is the ratio of the area of the glazing assemblies (including sliding-glass doors, skylights, and basement windows but excluding opaque doors) to the gross wall area, expressed as a percentage. The nominal area or rough opening is acceptable for flat windows. Up to 1% of the total allowed glazing area may be excluded from the U-factor requirement. For example, 3 ft^2 of decorative glass may be excluded from a building design with 300 ft^2 of glazing area.

2. **Glazing U-Factors** must be tested and documented by the manufacturer in accordance with the National Fenestration Rating Council (NFRC) test procedure or taken from the glazing U-factor table in Appendix B of the Prescriptive Packages User's Guide located at **www.energycodes.gov**. Center-of-glass U-factors cannot be used.

3. The **Ceiling R-values** do not assume a raised or oversized truss construction. If the insulation achieves the full insualtion thickness over the plate lines of exterior walls, R-30 insulation may be substituted for R-38 insulation. R-38 insulation may be substituted for R-49 insulation. Ceiling R-values represent the sum of cavity insulation plus insulating sheathing (if used). For ventilated ceilings, insulating sheathing must be placed between the conditioned space and the ventilated portion of the roof.

4. **Wall R-Values** represent the sum of the wall cavity insulation plus insulating sheathing (if used). Do not include R-values for air films, exterior siding, "housewraps", structural sheathing, or interior drywall. For example, an R-19 requirement could be met EITHER by R-19 cavity insulation OR R-13 cavity insulation plus R-6 insulating sheathing. Wall requirements apply to wood-frame wall constructions. Metal-frame wall or mass (concrete, masonry, log) wall equivalent R-values can be found in the Prescriptive Packages User's Guide located at **www.energycodes.gov**.

5. The **Floor R-Value** requirements apply to floors over unconditioned spaces (such as unconditioned crawlspaces, basements, or garages). Floors over outside air (such as cantilevers, bay windows, etc.) must meet the ceiling requirements.

6. **Basement Wall R-Values** apply to walls of conditioned basements below uninsulated floors and must be insulated from the top of the basement wall to a depth of 10 ft below grade or to the level of the basement floor, whichever is less. The entire opaque portion of any individual basement wall with an average depth less than 50% below grade must meet the same R-value requirement as above-grade walls. Windows and sliding glass doors of conditioned basements must be included with the other glazing.

7. The **Slab Perimeter R-Value** requirements are for unheated slabs. Add an additional R-2 for heated slabs. For packages with a slab insulation requirement, the insulation must extend a total linear distance of at least 48 in. in Zones 13-15. The insulation must extend: 1) down from the top of the slab, or 2) down from the top of the slab to the bottom of the slab and then horizontally underneath the slab, or 3) down from the top of the slab to the bottom of the slab and then horizontally away from the slab, with pavement or at least 10 in. of soil covering the horizontal insulation. Exterior exposed insulation shall be protected.

8. The **Crawl Space Wall R-Value** requirements are for walls of unventilated crawl spaces. The crawl space wall insulation must extend from the top of the wall (including the rim joist and sill plate) to at least 12 in. below the outside finished grade. If the distance from the outside finished grade to the top of the footing is less than 12 in., the insulation must extend a total vertical plus horizontal distance of 24 in. from the outside finished grade.

9. Normal refers to the efficiency requirements according to the National Appliance Energy Conservation Act (NAECA). It represents the minimum equipment efficiency which can be legally sold in the U.S. **High Heating** means a furnace AFUE of 90% or more, or a heat pump HSPF of 7.8 or more. **High Cooling** means a SEER of 12 or more. **High Heat/Cool** means both heating and cooling equipment must meet these minimum efficiencies. If you plan to install more than one piece of heating equipment or more than one piece of cooling equipment, the equipment with the lowest efficiency must meet or exceed the efficiency required by the selected package.

Notes:
The maximum **Door U-factor** is 0.35 for solid doors. One door may be excluded from this requirement. If a door contains glass and an aggregate U-factor is not available, include the glass area with your glazing and use the non-glazed door U-factor table in Appendix B of the Prescriptive Packages User's Guide located at **www.energycodes.gov**.

RES*check*™

3 simple ways to demonstrate compliance with the MEC or the IECC. **RES*check*** can be used when adopting authority has approved its use.

1. **Prescriptive approach** - allows builders or designers to select from various combinations of energy conservation measures based on "climate zone" location. Maps and prescriptive packages can be downloaded at **www.energycodes.gov/rescheck/packages_iecc.stm**
2. **Trade-off worksheet approach** - enables builders to vary insulation levels in the ceiling, wall, floor, basement wall, slab-edge and crawl space; glazing and door areas; and glazing and door U-factor.
3. **Software approach** – completes the same calculations as the trade-off worksheet but automates the procedure using Windows-based software.

FREE RES*check* Downloads: www.energycodes.gov/rescheck/download.stm

Air Leakage

All penetrations to the building envelope must be sealed, caulked, gasketed, weatherstripped or otherwise sealed. This includes, but is not limited to, areas around windows, doors, HVAC ductwork, plumbing pipe, electrical penetrations, etc. Recessed lights must meet one of the following conditions:

- **Type IC** rated with no penetrations between the inside of the fixture and ceiling cavity.
- **Type IC or non-IC** rated and installed in a sealed box constructed from 1/2" gypsum wallboard or other approved assembly.
- **Type IC** rated, tested and labeled as to being "airtight".

Vapor Retarders

Vapor retarders (with a maximum perm rating of 1.0) must be installed on the "warm-in-winter" side of all non-vented framed ceilings, walls and floors. Typical methods used are: Kraft-faced insulation, polyethylene sheeting and vapor retarder primers/paints.

Service Water Heating

Water heaters with pipe risers shall have heat traps on both the inlet and outlet of the water heater unless the water heater has integral heat traps or is part of a circulating system. Typical methods used for creating heat traps are "U" or "rams horn" bends in the flexible pipe connectors or installing aftermarket pipe nipples with integral traps.

Duct Insulation

RES*check* duct insulation values are based on the more stringent of the heating or cooling degree day requirement. Supply and return-air ducts located within crawlspaces, uninsulated basements, attics and framed wall cavities must be insulated to R-5. Ductwork located on the exterior of the building must be insulated to R-8.

Duct Construction

All joints, seams and connections must be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded fabric or approved tapes. Standard duct tape is not permitted.

Temperature Controls

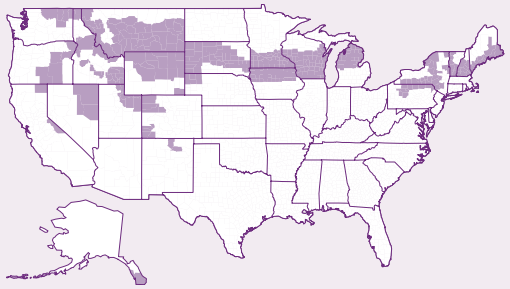
Thermostats must be capable of being set down to 55°F or lower for heating and up to 85°F or more for cooling. Thermostats for both heating and cooling must have a deadband (temperature range where no heating or cooling takes place) of at least 5°F. Heat pumps require a thermostat capable of preventing back-up heat from operating when the heating requirements can be met by the heat pump alone.

Swimming Pools

All heated pools must have an "on/off" pool heater switch and be equipped with a pool cover. All swimming pool pumps must be equipped with time clocks.

Printed with renewable – source ink on paper containing at least 50% waste-paper, including 20% post consumer waste. January 2003

RES*check*™



Zone 15

(HDD Range is 7000-8499)

Prescriptive Package Requirements

BUILDING ENERGY CODES