RES*check* Software Version 4.6.5

Compliance Certificate

Energy Code:	**2011 Vermont Residential Building Energy Standards**
Location:	**Burlington, Vermont**
Construction Type:	**Single Family**
Project Type:	**New construction**
Glazing Area Percentage:	**17%**
Heating Degree Days:	**7771**
Climate Zone:	**6**

Construction Site:	Owner/Agent:	Designer/Contractor:
GA	Building Builderson	Builders Building Plans

Compliance: **Passes using UA trade-off**

Compliance: **3.2% Better Than Code** Maximum UA: **372** Your UA: **360**

The % Better or Worse Than Code index reflects how close to compliance the house is based on code trade-off rules.
It DOES NOT provide an estimate of energy use or cost relative to a minimum-code home.

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Glazing or Door U-Factor	UA
Ceiling area of home forming top of insulation envelope: Flat Ceiling or Scissor Truss	1959	49.0	0.0		51
Front Wall area of home forming sides of insulation envelope: Wood Frame, 16" o.c.:Not Attic Kneewall	833	21.0	0.0		39
Window area of home using energy efficient units: Vinyl/Fiberglass Frame:Double Pane with Low-E	111			0.300	33
Energy efficient door unit: Solid	21			0.200	4
20 minute fire door: Solid	21			0.200	4
Left Wall area of home forming sides of insulation envelope: Wood Frame, 16" o.c.:Not Attic Kneewall	41	21.0	0.0		2
Back Wall area of home forming sides of insulation envelope: Wood Frame, 16" o.c.:Not Attic Kneewall	833	21.0	0.0		33
Window area of home using energy efficient units copy 1: Vinyl/Fiberglass Frame:Double Pane with Low-E	231			0.300	69
Energy efficient door unit: Glass	21			0.300	6
Right Wall area of home forming sides of insulation envelope: Wood Frame, 16" o.c.:Not Attic Kneewall	799	21.0	0.0		43
Window area of home using energy efficient units: Vinyl/Fiberglass Frame:Double Pane with Low-E	51			0.300	15
Slab perimeter of home forming bottom of insulation envelope: Slab-On-Grade:Unheated Insulation depth: 4.0'	87		8.0		61

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 2011 Vermont Residential Building Energy Standards requirements in RES*check* Version 4.6.5 and to comply with the mandatory requirements listed in the RES*check* Inspection Checklist.

Name - Title Signature Date

RES*check* Software Version 4.6.5

Inspection Checklist

Energy Code:	**2011 Vermont Residential Building Energy Standards**
Location:	**Burlington, Vermont**
Construction Type:	**Single Family**
Project Type:	**New construction**
Glazing Area Percentage:	**17%**
Heating Degree Days:	**7771**
Climate Zone:	**6**

Ceilings:

❑ Ceiling area of home forming top of insulation envelope: Flat Ceiling or Scissor Truss, R-49.0 cavity insulation
Comments: _____

Above-Grade Walls:

❑ Front Wall area of home forming sides of insulation envelope: Wood Frame, 16" o.c.:Not Attic Kneewall, R-21.0 cavity insulation
Comments: _____

❑ Left Wall area of home forming sides of insulation envelope: Wood Frame, 16" o.c.:Not Attic Kneewall, R-21.0 cavity insulation
Comments: _____

❑ Back Wall area of home forming sides of insulation envelope: Wood Frame, 16" o.c.:Not Attic Kneewall, R-21.0 cavity insulation
Comments: _____

❑ Right Wall area of home forming sides of insulation envelope: Wood Frame, 16" o.c.:Not Attic Kneewall, R-21.0 cavity insulation
Comments: _____

Windows:

❑ Window area of home using energy efficient units: Vinyl/Fiberglass Frame:Double Pane with Low-E, U-factor: 0.300
For windows without labeled U-factors, describe features:
#Panes ____ Frame Type _____ Thermal Break? ____ Yes ____ No
Comments: _____

❑ Window area of home using energy efficient units copy 1: Vinyl/Fiberglass Frame:Double Pane with Low-E, U-factor: 0.300
For windows without labeled U-factors, describe features:
#Panes ____ Frame Type _____ Thermal Break? ____ Yes ____ No
Comments: _____

❑ Window area of home using energy efficient units: Vinyl/Fiberglass Frame:Double Pane with Low-E, U-factor: 0.300
For windows without labeled U-factors, describe features:
#Panes ____ Frame Type _____ Thermal Break? ____ Yes ____ No
Comments: _____

Doors:

❑ Energy efficient door unit: Solid, U-factor: 0.200
Comments: _____

❑ 20 minute fire door: Solid, U-factor: 0.200
Comments: _____

❑ Energy efficient door unit: Glass, U-factor: 0.300
Comments: _____

Floors:

❑ Slab perimeter of home forming bottom of insulation envelope: Slab-On-Grade:Unheated, 4.0' insulation depth, R-8.0 continuous insulation
Comments: _____

Slab insulation extends down from the top of the slab to at least 4.0 ft. OR down to at least the bottom of the slab then horizontally for a total distance of 4.0 ft.

Air Leakage Verification:

- ❑ Building envelope air tightness and insulation installation complies by either 1) a post rough-in blower door test result of less than 5 ACH at 50 pascals OR 2) the items listed in the "Air Sealing and Leakage Installation" and "Insulation Installation' sections are verified through field inspection.

Air Sealing and Leakage Installation:

- ❑ A continuous, durable, rigid air barrier is installed in the building envelope. Breaks or joints in the air barrier are sealed. Air permeable insulation is not be used as a sealing material.
- ❑ Access openings, drop down stairs or knee wall doors to unconditioned attic spaces shall be insulated and gasketed.
- ❑ Junction of foundation and wall sill plates, wall top plate and top of wall, sill plate and rim-band, and rim band and subfloor are sealed.
- ❑ Spaces between fenestration jambs and framing and skylights and framing are sealed with minimum expanding foam.
- ❑ Rim joists having air permeable insulation installed has a durable, rigid interior air barrier installed at the rim joist.
- ❑ Floors (including above garage and cantilevered floors) having any any exposed edge of insulation have air barrier installed.
- ❑ Exposed earth in unvented crawlspaces is covered with Class I vapor retarder with overlapping joints taped.
- ❑ Duct shafts, utility penetrations, and flue shafts opening to exterior or unconditioned space are air sealed.
- ❑ Air sealing is installed between the garage and conditioned spaces.
- ❑ Recessed light fixtures and other appliances (speakers, exhaust fans, light shafts, etc.) installed in the building thermal envelope are IC rated, airtight labeled and sealed with a gasket or caulk between the housing and the interior wall or ceiling cover. Fixtures and appliances maintain required clearances of not less than 1/2 inch from combustible material and not less than 3 inch from insulation material, or as required by manufacturer installation requirements.
- ❑ All plumbing and wiring penetrations are sealed to the air barrier.
- ❑ Exterior walls adjacent to showers and tubs have a durable, rigid air barrier separating the exterior wall from the shower and tubs.
- ❑ Air barrier extends behind electrical or communication boxes or air sealed type boxes are be installed or created.
- ❑ Air barrier is installed in common wall between dwelling units. Common walls are sealed at junctions with outside walls and at the top pressure plane of the house.
- ❑ HVAC register boots that penetrate building thermal envelope are sealed to subfloor or drywall.
- ❑ A durable, rigid air barrier is installed in contact with insulation. Fireplaces have compression closure doors and combustion air supplied from the outdoors.

Insulation Installation:

- ❑ Vertical walls, sloped ceilings, and floors that make up the thermal envelope have air permeable insulation enclosed on all six sides and in contact with a durable, rigid air barrier.
  Exceptions:

  Dropped ceiling/soffit on a flat attic ceiling enclosed on five sides.
- ❑ All corners and headers making up the thermal envelope are insulated and enclosed on all six sides and in contact with a durable, rigid air barrier.
- ❑ Rim joists shall be insulated and air sealed.
- ❑ Insulation in floors (including above garage and cantilevered floors) is installed to maintain permanent contact with underside of subfloor decking.
- ❑ Crawl space walls insulation installed in lieu of floor insulation is permanently attached to crawlspace walls.
- ❑ Batts in narrow cavities are cut to fit; sprayed/blown insulation installed in narrow cavities conforms and fills the available cavity space.
- ❑ Plumbing and Wiring: Insulation is placed between the exterior of the wall assembly and pipes. Batt insulation is cut and fitted around wiring and plumbing, or for insulation that on installation readily conforms to available space such insulation shall fill all space between piping and wiring and shall be in full contact with all air barriers.
- ❑ Exterior walls adjacent to showers and tubs shall have insulation filling any gaps or voids between tub or shower walls and unconditioned space.
- ❑ Insulation completely fills voids between the electrical/phone/utility service boxes and exterior sheathing.
- ❑ Common wall: Whenever continuity of the building thermal envelope is broken at walls separating dwelling units in Group R-2 building, including common, party, and fire walls, such walls are insulated to a minimum of R-10 on each side of the break in insulation continuity.

Sunrooms:

- ❑ Sunrooms that are NOT thermally isolated from the building envelope meet the requirements applicable to the building envelope.
- ❑ Sunrooms that are thermally isolated from the building envelope have a minumum of R-30 ceiling insulation and a minimum of R-13 wall insulation.
- ❑ Sunrooms that are thermally isolated from the building envelope have a maximum fenestration U-factor of 0.45 and the maximum skylight U-factor of 0.55.

Vapor Retarder:

❑ Class I or II vapor retarders installed on the interior of all framed walls (Class I: Sheet polyethylene, unperforated aluminum foil, Class II: Kraft-faced fiberglass batts, Class III: Latex or enamel paint).
Exceptions:

Basement walls, below grade portion of any wall, construction where moisture or its freezing will not damage the materials.

Class III vapor retarders are permitted where vented cladding over fiberboard or gypsum, or R-7.5 insulated sheating over 2x4 framing, or R-11.25 insulated sheathing over 2x6 framing.

Materials Identification and Installation:

❑ Materials and equipment are installed in accordance with the manufacturer's installation instructions.

❑ Materials and equipment are identified so that compliance can be determined.

❑ Manufacturer manuals for all installed heating and cooling equipment and service water heating equipment have been provided.

❑ Insulation R-values, glazing U-factors, and water heating equipment efficiency are clearly marked on the building plans or specifications.

Duct Insulation:

❑ Ducts in unconditioned spaces or outside the building are insulated to meet the same R-value requirement that applies to immediately proximal surfaces (ceiling = R-49, floor = R-30, above-grade wood framed wall = R-20, above-grade mass wall = R-15) .

Duct Construction and Testing:

❑ Building framing cavities are not used as supply ducts.

❑ Building framing cavities are not used as return ducts.
Exceptions:

Framing cavities interior to the building thermal envelope.

❑ All joints and seams of air ducts, air handlers, filter boxes, and building cavities used as return ducts are sealed. Joints and seams comply with ACCA Manual D.

❑ Duct tightness test has been performed and meets one of the following test criteria:

(1) Postconstruction leakage to outdoors test: Less than or equal to 225.3 cfm (6 cfm per 100 ft2 of conditioned floor area).

(2) Rough-in total leakage test with air handler installed: Less than or equal to 112.7 cfm (3 cfm per 100 ft2 of conditioned floor area).

(3) Rough-in total leakage test without air handler installed: Less than or equal to 150.2 cfm (4 cfm per 100 ft2 of conditioned floor area).

Temperature Controls:

❑ Where the primary heating system is a forced air-furnace, forced air split system heat pump, packaged unit heat pump, or water/steam boiler, least one programmable thermostat is installed to control the primary heating system and has set-points initialized at 70 degree F for the heating cycle and 78 degree F for the cooling cycle.
Exceptions:

Solid fuel appliances and spaces served by radiant floor heating.

❑ Heat pumps having supplementary electric-resistance heat have controls that prevent supplemental heat operation when the compressor can meet the heating load.

Heating and Cooling Equipment:

❑ Heating and cooling equipment is sized in accordance with ACCA Manual S based on buidling loads calculated in accordance with ACCA Manual J or other approved methodologies. In addition, equipment oversizing is limited to a maximum of 15% for air conditioners and air source heat pumps, and 40% for all fuel-fired heating appliances. Refer to Section 403.6 for test criteria and oversizing allowances.

❑ Automatic or gravity dampers are installed on all outdoor air intakes and exhausts.

❑ For systems serving multiple dwelling units documentation has been submitted demonstrating compliance with 2011 Vermont Commercial Building Energy Standards.

❑ Electric resistance heating equipment in not installed/planned (i.e., such equipment is prohibited in the city of Burlington).
Exceptions:

Where such equipment can be shown to exhibit the lowest life-cycle cost.

Circulating Service Hot Water Systems:

❑ Circulating service hot water pipes are insulated to R-3.

❑ Circulating service hot water systems include an automatic or accessible manual switch to turn off the circulating pump when the system is not in use.

Heating and Cooling Piping Insulation:

❑ HVAC piping conveying fluids above 105 degrees F or chilled fluids below 55 degrees F are insulated to R-3.

Swimming Pools:

❑ Heated swimming pools have an on/off heater switch.

❑ Pool heaters operating on natural gas or LPG have an electronic pilot light.

❑ Timer switches on pool heaters and pumps are present.
Exceptions:

Where public health standards require continuous pump operation.

Where pumps operate within solar- and/or waste-heat-recovery systems.

❑ Heated swimming pools have a cover on or at the water surface. For pools heated over 90 degrees F (32 degrees C) the cover has a minimum insulation value of R-12.
Exceptions:

Covers are not required when 60% of the heating energy is from site-recovered energy or solar energy source.

Lighting Requirements:

❑ A minimum of 50 percent of the lamps in permanently installed lighting fixtures can be categorized as one of the following:

(a) Compact fluorescent

(b) T-8 or smaller diameter linear fluorescent

(c) 40 lumens per watt for lamp wattage <= 15

(d) 50 lumens per watt for lamp wattage > 15 and <= 40

(e) 60 lumens per watt for lamp wattage > 40

Other Requirements:

❑ Snow- and ice-melting systems with energy supplied from the service to a building shall include automatic controls capable of shutting off the system when a) the pavement temperature is above 50 degrees F, b) no precipitation is falling, and c) the outdoor temperature is above 40 degrees F (a manual shutoff control is also permitted to satisfy requirement 'c').

Certificate:

❑ A permanent certificate is provided on or in the electrical distribution panel listing the predominant insulation R-values; window U-factors; type and efficiency of space-conditioning and water heating equipment. The certificate does not cover or obstruct the visibility of the circuit directory label, service disconnect label or other required labels.

NOTES TO FIELD: (Building Department Use Only)

Vermont 2011 RBES Efficiency Certificate

Insulation Rating	R-Value
Ceiling / Roof	49.00
Above-Grade Wall	21.00
Below-Grade Wall	0.00
Floor	8.00
Ductwork (unconditioned spaces):	_____

Glass & Door Rating	U-Factor	SHGC
Window	0.30	NA
Door	0.20	NA

Heating & Cooling Equipment	Efficiency
Heating System:_____	_____
Cooling System:_____	_____
Water Heater:_____	_____

Name: _____ Date: _____

Comments: