

**ORDINANCE NO. 12
SERIES OF 2007**

**AN ORDINANCE OF THE BOARD OF TRUSTEES
OF THE TOWN OF CARBONDALE, COLORADO, ADDING PROVISIONS TO
THE MUNICIPAL CODE FOR THE ADDITION OF THE CARBONDALE
EFFICIENT BUILDING PROGRAM, CONCERNING THE CONSTRUCTION
OF RESIDENTIAL UNITS WITH EFFICIENT BUILDING PRACTICES
INCLUDING ENERGY COMPLIANCE FOR CHAPTER 15.09 OF THE
INTERNATIONAL ENERGY CONSERVATION CODE.**

BE IT ORDAINED BY THE BOARD OF TRUSTEES OF THE TOWN OF
CARBONDALE, COLORADO:

WHEREAS, the Carbondale Energy Plan outlines the desire of the community to
construct buildings in a more environmentally responsible and energy efficient manner;
and

WHEREAS, the Board of Trustees of the Town has determined the addition of
Carbondale Efficient Building Program to the municipal code will provide for education
of the community, promote the use of environmentally friendly construction methods
and renewable energy technologies, and foster economic development of “green”
businesses; and

WHEREAS, the Board of Trustees finds and determines that additional energy
efficiency enhancements are in the interest of public health, safety and welfare;

NOW THEREFORE, BE IT ORDAINED BY THE BOARD OF TRUSTEES OF
THE TOWN OF CARBONDALE, COLORADO, that the following additions to the
Town of Carbondale Municipal Code are hereby approved and adopted.

SECTION 1: A new Chapter 15.30 of the Carbondale Municipal Code, entitled
“Efficient Building Program—Residential” is added, to read as follows:

Chapter 15.30

Efficient Building Program--Residential

15.30.010	Purpose
15.30.020	Applicability
15.30.030	Exemptions
15.30.040	Point Requirements, Alternative Points, On-site Requirements
15.30.050	Renewable and Efficiency Fund – Fees and Spending
15.30.060	Inspection and Compliance

- 15.30.070** **Definitions**
- 15.30.080** **Section 1: Site/Water Conservation**
- 15.30.090** **Section 2: Recycling and Reuse**
- 15.30.100** **Section 3: Framing and Materials**
- 15.30.110** **Section 4: Indoor Air Quality**
- 15.30.120** **Section 5: Energy Compliance and Efficiency Improvements**
- 15.30.130** **Section 6: Solar Energy**
- 15.30.140** **Section 7: Innovation**
- 15.30.150** **Section 8: Alternative - Cash in lieu Points**
- 15.30.160** **Section 9: On-site renewable energy and exterior energy requirements**
- 15.30.170** **Carbondale Efficient Building Checklist**

15.30.010 PURPOSE

The intent of the Carbondale Efficient Building Program is to encourage cost-effective and sustainable building methods to create durable, energy efficient structures that conserve natural resources, promote the efficient use of building materials, and improve indoor air quality. Depending on the house size and use of exterior energy, there are requirements for on site renewable energy mitigation in order to promote a local self-sufficient energy economy as per the Carbondale Energy Plan.

15.30.020 APPLICABILITY

Carbondale Efficient Building Program applies to all new residential (single family, duplex, townhouse, accessory dwelling unit) construction per the currently adopted building codes, as well as multifamily and residential sections of multi- use projects, and additions/reconstruction (remodel) projects as defined by the International Building Code or as specified in definitions.

The Carbondale Efficient Building Program Checklist (CEB Checklist) and this code document are used for code enforcement. A resource guide will be provided for additional guidance and background references.

15.30.030 EXEMPTIONS

Houses or mixed use structures applying for historical designation may request the Community Development Department to exempt the structure from any requirements set forth in this Chapter 15.30. The Community Development Department shall refer any such request to the Community Office for Resources Efficiency (CORE) and/or the Building Department for comments before processing any such exemption request.

Mobile home units that are approved by Colorado Department of Housing are exempt.

In the event of any conflict between this Chapter 15.30 and any provision set forth in Title 18 of this Code (Zoning), Title 18 shall govern.

15.30.040 POINT REQUIREMENTS

A. General description

The points to be scored or minimum required points are based on total square footage or total square footage per unit (or an “average”) for multifamily and residential portions of multi-use projects. *See* Definitions for appropriate total square footage calculations. In multi-use and mixed use residential projects, points that are common to all units are gained for each unit and can be scored in each CEB checklist, *i.e.* recycled content siding, roof insulation.

B. Examples - Point Requirements

The number of points required is on a graduated scale and can be calculated directly in the CEB Checklist. Examples of points required for various new residential housing or other residential type construction are included below:

Size – Square footage:

- **2000** square feet or less **110 points or more**
- **3000** square feet **120 points or more**
- **4000** square feet **130 points or more**
- **5000** square feet **150 points or more**
- **6000** square feet **170 points or more**
- **7000** square feet **200 points or more**
- **8000** square feet **230 points or more**

For remodels or additions less than 2000 square feet:

- **500 square feet** **40 points**
- **1000 square feet** **60 points**
- **1500 square feet** **80 points**
- **2000 square feet** **110 points**
- **over 2000 square feet** **as per above**

If the construction permit is only for a detached garage, the point requirements shall follow the remodel and addition point schedule above.

Residential units in the multi-family and multi-use categories calculate total square footage as an “average” unit size as per the definitions. The points required are based on

this “average” size. Multi-family and multi-use projects receive credit against the points required for the “average” size for building efficiency as follows:

- **Credit of 10 points for efficiency of common walls**
- **Credit of 10 points if heating and hot water system is common to all units.**

C. Alternative Points- Cash in lieu:

Permit applicants may pay a cash fee in lieu of meeting some of the points required (see Chapter 30.8 -Section 8.0). Cash in lieu points are limited to 10% of the points required.

D. On-site Requirements

Houses over 3000 square feet must supply part of the energy use in the home on-site or elect to provide off site mitigation through a fee payment option (*see* Section 15.30.9.1). Also the code considers exterior energy uses over a nominal amount in Section 15.30.9.2. In order to offset the exterior use of energy, the use must be mitigated with renewable energy on-site or the applicant has an option to pay a fee.

15.30.050 RENEWABLE AND EFFICIENCY FUND

A. General Description

The Town will establish the Renewable and Efficiency Fund separate from the General Fund to support the installation of renewable energy and energy efficient technologies in the Town of Carbondale or in locations as approved by the Trustees.

B. Fees

Fees collected from items as per Section 8: Alternative Points - Cash in Lieu Points and Section 9: On-site Renewable Energy and Exterior Energy will be deposited to the Renewable and Efficiency Fund (REF).

Fees from Section 8: Cash in lieu fees maybe collected at time of permit or paid prior to Final Inspection and Certificate of Occupancy. Fees from Section 9: On-site or Exterior Energy are paid at time of permit. All fees maybe reviewed prior to Certificate of Occupancy for applicability and accuracy. Refunds or additional fees maybe assessed prior to Certificate of Occupancy.

C. Budget requests

The Environmental Board will meet periodically with the Community Office for Resource Efficiency (CORE) to recommend funding requests at least 2 times per year for review and approval by the Town Trustees.

D. Criteria for Authorizations:

Funds generated will be used to assist existing structures or new projects to achieve improved energy efficiency or renewable power generation in Town of Carbondale or for locations on a case by case basis as approved by the Trustees. It is suggested that such recommendations be based upon the following criteria:

- Meets Intent: The extent to which the proposed project meets the intent of the fund which is to encourage and promote energy efficiency and renewable energy in the town of Carbondale. This intent should be met by assisting in the incremental upgrade of a project, and shall not be utilized for construction costs required for code compliance.
- Cost/Benefit: The extent to which the proposed project provides an economic return on appropriations invested.
- Public benefit: The extent to which the proposed project offers a public benefit to the Carbondale community.
- Affordable Housing: Special consideration is given to projects that positively affect occupants of local affordable housing in the Town of Carbondale. Funding may assist in the incremental upgrade of a project, and shall not be utilized for construction costs required for code compliance.

Other items that maybe considered for funding:

- Focused education for the Carbondale Efficient Building Program. Educational materials and events including but not necessarily limited to, printed process guides, resource reference guides, efficient building educational events to assist participants in code compliance, a webpage with available resources, links, and information
- Residences applying for Historical Preservation may apply for design assistance for mechanical and electrical renovations.
- Activities related to implementing recommendations and conservation efforts as per the Town of Carbondale's Energy Plan

15.30.060 INSPECTION AND COMPLIANCE:

A. General description

These regulations identify the specific requirements for complying with the Carbondale Efficient Building (CEB) code. The sections and numbers in these regulations correspond to the sections and numbers on the CEB Checklist. The CEB checklist is most easily handled via an electronic spreadsheet, but can be filled in by hand. The CEB checklist and other related documents are available at the Building Department or at www.carbondale.gov

B. Permit application

Two copies of a completed CEB Checklist, scoring the required points, must be submitted with the building permit application.

In addition permit applications must contain 2 copies of Energy Compliance Documents (REScheck, Energy Star or letter advising on use of prescriptive 2003 International Residential Energy Code – see Section 15.30.120 for details 15.30.120). The permit application will not be processed without the completed CEB checklists and the Energy Compliance Documents.

C. Inspections

Items selected on the Carbondale Efficient Building Program Checklist will be scored and submitted for plan review and in field inspections accordingly. Field inspections are noted on the right column of the CEB checklist.

Compliance methods for each CEB checklist item described herein will be demonstrated by “Inspection” and/or “Documented”. If compliance is "Inspected", Town staff will inspect these measures during their typical inspections. Inspections are listed as **PC: Plan Check, 1: Foundation, 2: Framing, 3: Insulation, 4: Rough-in, 5: Final.** (Please read the "Compliance" section of the specific measure to see which type of inspection is required.)

D. Documented Items

Items selected that are “Documented” shall require the submission of appropriate documentation to establish compliance at time of inspection. If documentation is required for an item, this documentation should be kept in the inspection container at the site. The Town of Carbondale reserves the right to conduct a documentation and inspection review after the 4th inspection to determine if “Cash in lieu points” are needed to meet point requirements.

E. Failed Inspections or Compliance audits

In addition, the Town may conduct follow-up inspections or compliance audits of “documented” measures prior to issuing a C.O. If a compliance audit is conducted, the contractor must provide documentation for these items. If for any reason an inspection fails and the checklist has to be revised for compliance, then a revised CEB Checklist must be resubmitted to the building department within 30 days of the failed inspection and/or prior to final certificate of occupancy.

Prior to final inspection, fees and checklist maybe reviewed to the revise fee schedule if necessary.

15.30.070 DEFINITIONS

A. General

Definitions included herein are for interpretation of this chapter 15.30 of code only.

B. Basement

A basement is that portion of a building that is partly or completely below grade.

C. Community Office for Resource Efficiency (CORE)

CORE- Local non-profit 501c(3) energy office that is working with the Town of Carbondale to implement a clean energy future in the Roaring Fork valley.

D. Floor Area

The floor area gross is defined as the sum of the horizontal areas of floors of a building measured from the exterior face of exterior walls or, if appropriate, from the center line of dividing walls.

E. Multi-Family

Multi-family projects are as per the International Residential Code: buildings or portion thereof designed for occupancy by three or more families living independently, including apartment houses, in which they may or may not share common entrances and/or other spaces. Individual dwelling units may be owned as condominiums, or offered for rent.

F. Multi-use

Multi-use projects may include different occupancies including residential type, commercial and industrial. This code applies only to the residential portions of these projects.

G. Total Square Footage

For the purposes of this program, the Total Square Footage is calculated as follows: Sum all floor areas for habitable spaces including mezzanines, intermediate floored tiers, and unfinished attics with legal stairs and egress windows. Basement and garage floor areas shall be added to the above totals by adding 50% of the total basement and garage floor areas to the floor area for habitable spaces.

Each unit of a duplex or row of townhouses shall calculate the total square footage of each unit.

Multi-family projects will calculate the total square footage and the points required by dividing the Total Square Footage as per above by the number of units, to obtain the “average” square footage per unit. Points required for each unit are based on this “average” square footage.

Mixed residential/commercial multi-use projects will calculate the floor area as per above for each unit by dividing the square footage of all the residential sections (including halls and common areas) of the buildings and dividing by the number of units to obtain the “average” floor area per unit. Points required for each unit are based on this “average” square footage.

Areas not included in the Total Square Footage: 1. Covered walkways, open roofed-over areas, porches and similar spaces; 2. Pipe trenches , exterior terraces or steps, chimneys , roof overhangs and similar features.

15.30.080 Site/Water Conservation (Section 1)

1.1: Construction does not impact site 15’ outside building footprint 2 points

Vegetation shall not be impacted by construction area. Show detailed construction management plan with fence/limits of construction no more than 15 feet around proposed building footprint. Driveway and material storage exempted.

Compliance: Plan check and inspected (PC, 1: Foundation).

1.2: 100% of topsoil saved and reused on site 2 Points

Topsoil must remain on site during construction. Storage area for topsoil must be indicated on the site plan. Care should be exercised to conform with the Carbondale Weed Management Plan.

Compliance: Inspected (1: Foundation).

- 1.3 100% of excavated fill reused on-site or within a 3-mile radius**
- | | |
|----------------------|-----------------|
| On site: | 2 points |
| Within 3-mile radius | 1 point |

Reuse of excavation material locally reduces transport of material and impacts. For points within a 3 mile radius, provide a signed receipt with details on the location.

Compliance: Inspected (1: Foundation)- Documentation required for off-site point.

- 1.4 House size less than the national standard** **8 points**

Average house size has increased dramatically over the past 20 years requiring additional heating energy, electricity and materials used in construction. Houses designed with square footage (not including basements) below these sizes achieve these points.

Average house sizes:

- For a studio 650 sf,**
- 1 bedroom: 800 sf,**
- 2 bedroom: 1,375 sf,**
- 3 bedroom: 1,900 sf,**
- 4 bedroom plus: 2,650 sf.**

Compliance: Show calculation of house size on site plan. Inspected (PC)

- 1.5: Erosion Controls during construction** **1 point**

Reduce runoff from construction sites by providing silt fencing or straw-bales in runoff areas. Protect stockpiled soil and disturbed areas from erosion.

Compliance: Inspected . (1: Foundation)

- 1.6: Deciduous trees/large shrubs provide summer shade to west of structure.** **1 point**

Mature landscaping must shade over 50% of subject glazing area. Show plantings on landscaping plan to provide shade from solar gain on west elevation from 2-6pm in summer.

Compliance: Inspected. (PC)

XERISCAPE LANDSCAPING

- 1.7 Addition of organic material to soil or use 2” of mulch or bark on all planting beds.**

1 Point

Organic material can include but is not limited to, manure and compost. Or mulch all planting beds with wood chips or bark at least 2" deep. (Except desert plantings.)

Compliance: Inspected and Documented **(5: Final)**

1.8 and 1.9 Reduction of turf areas.

1.8 Area limited

3 Points

1.9 Xeriscape

5 Points

Irrigated turf area of high water demand turf must be less than 25% of landscaped area, or 2000 square feet, whichever is smaller for 3 points. Or use low-water-demand or xeriscape-rated plants ONLY in 50% of landscaped area or 2000 sq.ft. which ever is smaller for a total of 5 points.

Documentation includes landscaping plan or alternate, and must show xeriscape plants listed by Colorado State University Extension Horticulture office, listed on www.xratedgardening.com, or other recognized source.

Compliance: Inspected and Documented **with landscape plan. (5: Final)**

1.10 Provide education on low water plants and list of xeriscape plants

1 Point

Provide list of appropriate low water plants to homeowner as listed by Colorado State University Extension Horticulture office, listed on www.xratedgardening.com, or other recognized source.

Compliance: Inspected and Documented – **copy of list in the inspection container. (5: Final)**

IRRIGATION SYSTEMS

1.11 Non –potable water used for irrigation

2 Points

Use water sources other than potable city water for irrigation if appropriate access to water right is available from Town or other source. Indicate sources on plan.

1.12 Drip irrigation

2 Points

At least 50% of landscaped area should include low to moderate water demanding plants, and should be irrigated with drip irrigation, bubbler, or micro-spray systems.

1.13 Zoned irrigation system.

2 Points

Irrigation system must be zoned to deliver different amounts of water appropriate to the different plant zones. High-water zones should NOT be immediately adjacent to large hardscapes such as driveways or streets. Turf and planting beds must be zoned separately.

1.14 Timer Controls Installed

REQUIRED

REQUIRED if irrigation is to be installed, high-water zones should have irrigation controls that include timed devices; timer shall have night time activation with city water supplied systems. Night time activation for ditch water systems is required, if possible.

Compliance: Inspected and Documented **with landscape plan. (5: Final)**

1.15 Rain sensor installed with irrigation system.

2 Points

Sensors installed as part of an irrigation system turn off system when adequate rainfall has occurred. (Inspected 5: Final)

Note: Compliance for Irrigation Points above: Documentation shall include landscape plan or alternate signed by the architect as compliant with the above points for irrigation. Inspected (5: Final).

WATER CONSERVATION:

1.16 High Efficiency or dual-flush toilets

1-4 Points

A toilet that has maximum 1.4 gallons per flush (GPF) or less with ≥ 400 grams per flush as per www.cuwcc.org web site listing in the MaP test 8th version or (more recent) qualifies as a low-flow toilet – 1 point for one toilet, 2 points for 2 or more. Install one or more dual flush toilet for 2 points. For maximum of 4 points, install 2 or more low flow and 2 points for one dual flush toilets..

Compliance: Provide documentation on site. Inspection. Toilet must be on the MaP list to qualify (5: Final).

1. 17: Low-flow showerheads

1 Point

Showerheads 2.0 gallons per minute or less must be installed on all showers. Only 1 shower head in each shower to obtain points.

Compliance: Provide any documentation for on-site inspection. (5:Final)

1.18 Hot water recirculation system

1 Point

Saves water by maintaining hot water at faucets. Sensors or switches turn circulation pumps on an off to save energy.

1.19: Water efficient clothes washer 3 Points

Select an Energy Star front loading washer to save both water and energy.

Compliance: Inspected (5: Final). Must be installed.

15.30.090 Section 2: Recycling and Reuse

2.1: Wood, scrap metal, cardboard recycled on site 2-6 Points
2 points per material type recycled

There shall be labeled containers or areas on site designated for recycling with evidence of use and service. The Pitkin landfill offers a reduced tipping fee for separated wood waste and cardboard can be recycled free. For example, if cardboard and wood scrap was being recycled in containers on site, 4 points would be given. Field inspected.

Compliance: Inspected in field (1 thru 5)

2.2: Use of spruce/pine beetle salvage wood 4 points for structural
1 point for other uses- 2 total

Spruce/pine beetle affected lumber harvested in Colorado can be utilized as dimensional framing material, as well as siding, flooring and trim. Material must be used for over 50% of the use in the structure. For example: for flooring, 50% of the flooring installed must be pine or spruce beetle affected for 1 point. Provide documentation of source.

Compliance: Inspected and Documented. (2: Framing or 5: Final)

2.3 Use of compost from local landfills for landscaping 2 Points

Provide delivery or purchase slip confirmation in the permit sleeve.

Compliance: Inspected with documentation (5: Final)

2.4 20% or more of fly ash content in over 50% of concrete used 3 Points

Provide receipt from batch plant. Follow guidelines of American Concrete Institute for cure time.

Compliance: Inspected. (**1:** Foundation)

2.5 Recycled Class 5- 6 concrete or asphalt material 2 Points

This material is locally available from LaFarge, Pitkin County Solid Waste Facility and other yards. Call locally to use this material for road base or driveways.

Compliance: Inspected with documentation. (**5:** Final)

2.6: Reclaimed materials

**Total points available 8 points
2 point per material used**

Use of construction materials that have been reclaimed from another structure qualify. Materials that are purchased from a reclaimed materials distributor, deconstructed by the owner/applicant from another structure, or that are purchased from a used building materials exchange (RECON in Wolcott, Habitat Store in Gypsum, Construction Junction in Carbondale, Resource Yard in Boulder) all qualify as reclaimed materials.

Material information/documentation must be on job site for inspection.

Compliance: Inspected with documentation. (**4:** Rough In)

**2. 7 Recycled Content Materials 8 Points available
2 Points per material**

Some common recycled-content materials include steel studs/I-beams, composite decking, cellulose or shredded cotton batt insulation, recycle-content carpets, counter tops, recycled-content tile. Provide material info with building permit; field inspected. Material must be used for over 50% of the use of this type material in the structure. (Recycled content roofing and siding not included in these points- see 3.14 and 3.16)

2.8 Built in recycling center 3 Points

Install at least 2 bins in built in kitchen recycling center to receive these points. Design recycling center to handle glass, cans, paper and other common recycling items.

Compliance: Inspected in field (**5: Final**)

15.30.100 Framing and Materials (Section 3).

OPTIMAL VALUE ENGINEERING

Incorporate optimal value engineering (OVE) framing techniques 2-9 Points

OVE is a technique for minimizing the amount of wood used for framing a structure by only using the amount of wood required for structural integrity and nail backing for wall sheathings and drywall. OVE framing can reduce the amount of time and lumber used in house construction by 25%. OVE framing also reduces heat loss by allowing more insulation, and reduces drywall cracking by minimizing opportunities for differential movement between the wood and the drywall.

Compliance for OVE items: Inspected. (2: Framing)

3.1 Use of 24-inch on center studs for over 50% of the structure 3 Points

Framing on 24" centers reduces wood use and saves money. Be sure to verify structural requirements.

3.2 Insulate Corners prior to framing inspection 2 Points

Insulating corners during construction prevents insulation 'voids' often found with box corners. Better yet, use 3 stud, turned corners, drywall clips or ladder blocking.

3.3 All closet headers flat framed to minimize over framing 1 Point

Closets do not require upright 2x4 headers, simply frame the rough opening with a 2x4 laid flat.

3.4 Structural/framing dimensions in 2' increments 2 Points

Most building products come in 2' increments, building to this dimension minimizes waste. Even dimensions reduce material waste and labor. Show exterior dimensions on site/floor plans. Exterior dimensions in 2' increments must be incorporated in 75% or more of the building footprint.

3.5 Single Trim Windows- 1 Point

Use of metal hangers for window headers in lieu of jack studs allows room for more insulation and minimizes thermal bridging.

STRUCTURAL ELEMENTS:

2-24 Points

**3.6 Engineered I- Joist used in floors
And roofs**

2 Points

2 Additional Points

Use of engineered wood I-joists, I-studs in place of solid dimensional lumber improves material efficiency. Engineered system must be in place for over 50% of the structure. Floors only: 2 points. Floors & roofs: 4 points.

Compliance: Inspected. (2: Framing)

3.7 Engineered Lumber used in structural applications 2 Points

Use of glue laminated beams and other engineered alternatives in structural applications for more than 75% of structural material

Compliance: Inspected. (2: Framing)

3.8 Structural Insulated panels or Strawbale 10 Points

SIP panels, a foam core laminated to oriented strand board, or straw bale construction both provide superior R-values and reduced air infiltration than conventional 2x6 wall construction. Must be used for >75% of exterior walls. Show details on plans and inspected in field.

Compliance: Inspected. (2: Framing)

3.9: Pre-cut studs, pre-fabricated roof trusses. 2 to 4 points

Pre-cut or off-site construction of structures reduces material waste. Use of pre-cut studs (2 points) or roof trusses (2 points) for over 75% of the structure.

Compliance: Inspected. (2: Framing)

3.10: Panelized pre fabricated walls, and/or sections. 1-2 Points

Use of panelized or pre-fabricated walls: 1 point. Use of prefabricated sections or modular construction for over 75% or more of home: 1 additional point .

Compliance: Inspected. (2: Framing)

3.11 Finger jointed studs or engineered studs for more than 50% of framing 3 Points

Use these studs for improved framing efficiency and improved structural integrity.

Compliance: Inspected. (2: Framing)

EFFICIENT MATERIALS

3.12 Oriented Strand Board (OSB) in sub floors and/ or sheathing 2 Points

Use OSB for over 50% of specified material used in these applications. (See low toxic OSB points 4.5 for additional points)

Compliance: Inspected. (2: Framing)

**3.13: Materials manufactured within Colorado and/or rapidly renewable
Materials 8 points total
1 point per material used**

Provide documentation on-site for any materials used that are manufactured in-state and/or are considered rapidly renewable. Rapidly renewable materials are building materials needing 10 years or less of growth for their harvest. (Bamboo, cellulose, aspen). Concrete not included.

Compliance: Inspected. (4: Rough in)

3.14 Roofing 30 Year Roofing or Steel with \geq 75% Recycle Content 2 Points

Install roofing with minimum 30 year life or metal roofing with greater than 75% recycle content. Other roofs that will qualify include faux shake/slate roofing. Provide cut- sheet for roofing 30 year or metal with recycle content.

Compliance: Inspected with documentation (5: Final)

3.15 Aerated Concrete Block 3 Points

This material is light and easy to work with- this product is an interlocking block and reduces the use of energy intensive concrete versus conventional concrete blocks.

Compliance: Inspected with documentation (2: Framing)

3.16 Fiber-cement, Stucco or Recycled siding 1 Point

Install fiber- cement, stucco or recycled content siding for over 50% of exterior wall surfaces for one point. Documentation for recycled siding: Cut- sheet for recycled material with receipt.

Compliance: Inspected (4: Rough in)

FSC or SFI CERTIFIED MATERIAL 2-18 points available this section

Sustainably-harvested wood products certified by either the Forest Stewardship Council (FSC) or Sustainable Forestry Initiative (SFI). Material must be used in over 50% of the application in the building. Documentation is required showing certification for each material specified. Documentation should be available at framing inspection or Final depending on use for framing or finish material as appropriate.

3.17 SFI Sustainable harvested lumber for at least 50% of framing material.

4 Points.

3.18 FSC Sustainable harvested lumber for at least 50% of framing material. 8 Points.

3.19 Install sustainable certified trim and/or flooring/or other – 2 Points available for each material used – up to 6 Points available.

3.20 FSC Sustainable certified cabinets 4 Points

Install FSC sustainable certified cabinets for 4 Points.

3.21 Install sustainable certified windows/doors or outdoor structures. Total available -6 Points 2 Points for each application

Each application is 2 points with a total available of 6 points. For example: windows made with certified wood – 2 points.

Compliance for 3:17-3:21: Inspected and documentation. (2: Framing and 5: Final)
Documentation is required showing certification for each material specified.
Documentation should be available at framing inspection or final as appropriate..

FOUNDATION ELEMENTS: 19 Points available this section

3.22 Non solvent based foundation water proofing 3 Points
Use non-solvent based waterproofing on all walls receiving waterproofing.
Documentation may be requested.
Compliance: Inspected. (1: Foundation).

3.23 Efficient Insulated Concrete Forms (ICFs) 4 Points

Use Grid type or Post and Beam ICFs that use less concrete, with over 50% recycled content for basement/foundation walls.
Compliance: Inspected (1: Foundation)

3.24 Precast concrete wall foundation system 2 Points

Precast wall systems reduce the amount of time and energy needed for foundation systems – one type to use is Superior Wall Systems . www.superiorwalls.com

Compliance: Inspected (1: Foundation)

3.25 Recycled Content Insulated Concrete Forms (ICFs) 2 Points

Recycled Content Insulated Concrete Forms (ICFs) are expanded polystyrene form blocks which are stacked with concrete poured into the internal void. ICFs provide improved insulation and reduced moisture transport over conventional foundation walls. ICFs shown on structural drawings for plans.

Compliance: Inspected (1: Foundation)

3.26 Frost protected shallow foundation 3 Points

Use this design technology for more than 50% of the perimeter foundation. Provide details as per the International Residential Code.

Compliance: Inspected (1: Foundation).

3.27 Unventilated Crawl Space 3 Points

Construct all crawlspaces according to guidelines in ASHRAE Book of Fundamentals, section 23.11. Insulate walls to code and ventilate with indoor air. Provide details demonstrating an approved design. Floor must be covered with vapor diffusion plastic retarder sealed to walls.

Compliance: Inspected (3: Insulation).

3.28 Controlled Ventilated Crawl 3 Points

Construct all crawlspaces according to guidelines in ASHRAE Book of Fundamentals, section 23.11. Provide automatic dampers on crawl space vents. Provide details demonstrating an approved design. Floor above crawl must be insulated at R-21 or above.

Compliance: Inspected (3: Insulation).

15.30.110 Indoor Air Quality (Section 4)

CHEMICAL REDUCTION: 4.1-4.9 Choose at least 1

4.1 Formaldehyde-free and/or low-toxic insulation 4 Points

Insulation must be labeled as formaldehyde-free or Green Guard certified at www.greenguard.org

Compliance: Inspected (3: Insulation).

4.2 Low- or zero-VOC and/or low-toxic interior paint 2 Points

EPA regulations call for no more than 250 gm/L of Volatile Organic Compounds (VOCs) in Low-VOC latex paints and no more than 380 gm/L for Low-VOC oil-based paints/stains. Products must be either labeled “Low VOC”, Green Guard certified www.greenguard.org , or show that VOC levels are below EPA thresholds.

Compliance: Documented (5:Final).

4.3 Water based lacquers and water based finishes on woodwork 2 Points

Lacquers and wood finishes can contain toxic compounds. Check out water based products to reduce off-gassing of toxic substances in your home. Check for Green Guard recommended water based products www.greenguard.org .

Compliance: Documented (5:Final).

4.4 Solvent-free and/or low-toxic construction adhesives 2 Points

Use construction adhesives free of aromatic hydrocarbons or solvents, throughout the house. GREENGUARD™ Certified adhesives comply with this requirement.

Compliance: Documented.

4.5 Low Toxic Oriented Strand Board 2 Points

Use low-toxic OSB for 50% or more of OSB wherever OSB is specified. GREENGUARD™ Certified OSB complies with this requirement.

Compliance: Inspected: (2: Framing) documentation from supplier.

4.6 Low-or non-toxic floor coverings 2 Points

Materials either listed on www.greenguard.org or show that coverings are below EPA thresholds for low/non-toxicity. Cutsheet with material specification shall be provided. One point per specified material- maximum 2 points.

Compliance: Inspected with documentation: (5: Final)

4.7 Elimination or sealing of all particleboard inside building shell 1-2 Points

Provide materials specs for alternatives used; if particle board has been eliminated for 2 Points (i.e. strawboard). If all exposed particleboard is sealed, must be with 3 coats low-VOC sealer for 1 Point.

Compliance: Inspected. Documented (5: Final)

4.8 All ducts sealed during construction

1 Point

As the ducts are installed, the duct openings into the interior spaces shall be sealed with plastic or other material to eliminate contamination and dust entering the ducts. Dirt, sawdust and other construction waste can fall into open ductwork during construction. This can be difficult to clean out and lead to dust and mold problems. Cover ducts with cardboard or polyethylene and tape down.

Compliance: Inspected. Documented (3-5: Insulation -Final)

MECHANICAL SYSTEMS- Choose at least one:

4.9 Automatic exhaust fan in attached garage or no attached garage or detached garage

2 Points

Exhaust fumes from vehicles in an attached garage can enter a living space. If attached garage exists, or there is habitable space above a garage, submit specifications on properly sized mechanical exhaust ventilation, running on a timer that automatically turns on when garage door closes. Points also for no attached garage.

Compliance: Inspected (2: Framing).

4.10 Reduce Point Source Pollution

2 Points

Install exhaust fans at stove and in all bathrooms, including bathrooms with exterior windows.

Compliance: Inspected (2: Framing)

4.11 Energy Star low sone bathroom fans

1-2 Points

Install quiet, low sone (less than 1.0) bathroom fans for these points. One point per fan. Reference the Energy Star web site: www.energystar.org.

Compliance: Inspected (5: Final)

4.12 Carbon monoxide detectors

3 Points

Install an electric (hard-wired) or AC/DC carbon monoxide detector, located near sleeping areas. Not applicable to structures without gas/propane service.

Compliance: Inspected (5: Final)

4.13 High efficiency pleated air (HEPA) filter on HVAC system 2 Points

Install a high efficiency filter on a forced-air furnace system. Any High Efficiency Particulate Air (HEPA) filter must be rated at 99% efficiency or higher. MERV 11 minimum. HEPA – Carbon filter systems also count for these points.

Compliance: Inspected (5: Final)

4.14 Rough in Passive Radon Mitigation 3 Points

Design and install radon mitigation system that removes radon or other soil gas from under the slab/crawlspace/basement and vent passively per EPA guidelines. More information at www.radon.org and www.buildingscience.com. Passive system will allow for addition of fan to exhaust radon if needed. A completed system may include an operating fan on the exhaust side to exhaust radon or work passively.

Compliance: Inspected (2: Framing).

4.15 Mechanical Room Sealed 1 Point

Mechanical equipment such as the furnace/boiler and water heater must be located in a separate room from living spaces. The room should be sealed off with a continuous air-barrier, to minimize air infiltration from the mechanical area to the rest of the house. Room must be fitted with an exterior solid-core door weather-stripped to exterior specifications. (Consider this strategy if not selecting 4.16)

Compliance: Inspected (3: Insulation).

4.16 Furnaces, boilers, gas hot water heaters sealed combustion/direct vented. 4-8 points

Sealed combustion/directed vented gas appliances reduce the risk of exhaust entering interior habitable areas. Four points for each gas appliance, limit 8 points total.

Compliance: Inspected (5: Final).

4.17 Mechanical ventilation for fresh air supply (see also 5.28) 2 Points

Design and install a ventilation system that complies with ASHRAE 62.2-2004, “Ventilation and Acceptable Indoor Air Quality in Low –Rise Residential Buildings” .

Total ventilation air (cubic feet per minute or CFM) shall be calculated by the following equation: $CFM = (\text{total number of bedrooms} + 1 \text{ times } (7.5 \text{ CFM}) + (0.01 \text{ times total conditioned square feet})$ See also Section 5.28 for alternative method for indoor air quality improvement with air-to-air heat exchanger. If using Air to Air heat exchanger (5.28) count these points for mechanical ventilation too.

Compliance: Inspected (5: Final). PC- Documentation – show calculation on the plans.

15.30.120 Energy Compliance (Section 5)

5.0 REScheck OR ALTERNATIVE COMPLIANCE FOR ENERGY CODE

Choose one method 5.1- 5.3

5.1 REScheck REPORT

REQUIRED

A completed REScheck software report and a copy must be submitted with permit application to demonstrate building compliance with the Town's energy code. US Department of Energy has the REScheck compliance tool on its web site:
<http://www.energycodes.gov/rescheck/>

AND

Copy of REScheck report in inspection container

REQUIRED

A copy of the REScheck report (from the permit set) must be included in the inspection container at site.

Compliance: IECC 2003 must be selected in the code selection portion of the REScheck software and requires a "Pass" result.

OR

5.2 Compliance with certified Energy Star rating and HERS of 100 or less

REQUIRED

REScheck not required if home obtains a HERS rating of 100 or less with a certified Energy Star rater report submitted from Energy Star plans review. Certified Energy Rater will complete energy inspections. Documentation required: submit testing report for final inspection. Complete information, including a list of local rating professionals is available at www.e-star.com

Compliance: PC- submit a ‘From Plans’ review by certified Energy Star rater; **5: Final inspection** –Energy Star testing completed and Energy Star rating in permit sleeve prior to final inspection

OR

5.3 Compliance via prescriptive method

REQUIRED

Alternative compliance method is available to meet requirements of Chapter 11 of the 2003 International Residential Code for Zone 15. Architect or owner shall submit a letter agreeing to meet the standards of the 2003 IRC; requirements include:

Glazing U-Factor: maximum	0.35 Btu/(hr.ft ² °F)
Ceilings/Roofs-	R-49 minimum
Walls	R-21 minimum
Floors (under heated spaces)	R-21 minimum
Basement Walls	R-11 minimum
Slab perimeter	R-13 minimum of 4ft depth
Crawl space walls	R-20 minimum

PERFORMANCE BETTER THAN CODE

27 Points available

5.4 REScheck Report Better than Code

1-10 Points

Depending on the building envelope and mechanical system efficiencies, REScheck may report performance better than code. Obtain 1 point for every 1 % better than code to a maximum of 10 Points for 10% better than code.

5.5 Energy Star - HERS 80 or less

10 points

Submit E-Star™ ‘From-Plans’ rating certificate for compliance for building permit application. REScheck not required. Complete information, including contacts for local rating professionals is available at www.e-star.com.

Obtain a ‘Final’ rating certificate for the house by Energy Rated Homes of Colorado (E-Star™), with a HERS score of at 80 or below. Blower Door test as part of E-Star rating is required.

Compliance: Inspected (**5: Final**). E-Star™ ‘Final’ rating certificate placed in permit sleeve

5.6 Energy Star - HERS rated house 70 or less

10 points

As per 5.5, submit E-Star™ ‘From-Plans’ rating certificate for compliance for building permit application. REScheck not required. Complete information, including local rating professionals is available at www.e-star.com.

Obtain a ‘Final’ rating certificate for the house by Energy Rated Homes of Colorado (E-Star™), with a HERS score of at 70 or below. Blower Door test as part of E-Star rating is required – No points for 5.7. Add these points to points for 5.5.

Compliance: Inspected (5: Final). E-Star™ ‘Final’ rating certificate placed in permit sleeve

5.7 Blower Door Test Only 3 points

Complete a blower door test by a certified professional that accurately shows air changes per hour (ACH) and pinpoints areas of air infiltration. Test results must show ACH of 0.35 or less. Homes with this result should have fresh air make-up, (see mechanical ventilation Section 4.17 and air to air heat exchangers Section 5.28). Blower door test shows where the air can enter and exit through holes in your house where more attention is needed.

Compliance: Documentation from Blower Door professional in permit packet prior to Final inspection. Inspected: (5: Final)

EFFICIENT ENVELOPE - INSULATION MEASURES

5.8 Efficient headers on all exterior walls 2 points

Efficient headers refers to insulated headers on exterior walls. Headers shall be insulated to (Minimum R-10). Also eliminate headers in non-load bearing walls.

Compliance: Inspected. (2: Framing)

5.9 Raised Heel Trusses 4 Points

Raised Heel Trusses provide roof space at the exterior wall for insulation at a critical place at the exterior wall- roof interface. Minimum size raised heel is 12 inches. Code allows minimum R-38 insulation with Raised Heel Trusses. Use this system with added insulation above R-38 for points as per Section 5.10. Provide additional space in the truss for insulation and ventilation as required.

Compliance: Inspected (2: Framing).

5.10 Roof/ceiling insulation 1 to 11 Points

Show roof/ceiling insulation on plans. Conventional framing- One point given for each R value over 49, up to 6 points maximum. For example: R- 52= 3 points. For raised heel trusses, one point given for each R value over R-38, add insulation up to R-49 for maximum 11 points.

Compliance: Inspected. (3: Insulation)

5.11 Wall insulation

1 to 10 Points

Show wall insulation in construction plans. One point given for each R value over 21, up to 8 points maximum. For example, if an R-28 wall is installed, 7 points would be given.

Compliance: Inspected. (3: Insulation)

5.12 Continuous insulation on the exterior

3 Points

Show wall insulation in construction plans. Exterior insulated sheathing is installed on 75% of the exterior to reduce air infiltration and provide added insulation at framing. Sealed with appropriate tape at seams, this sheathing also provides a water barrier if installed properly under exterior siding. R-3.5 minimum.

Compliance: Inspected. (3: Insulation)

5.13 Crawl space/basement wall insulation

2 to 6 Points

For crawl space and/or basement walls provide exterior perimeter insulation, show insulation of wall in construction plans. Insulation must be continuous for entire wall area below main floor. For minimum R-10 – zero points for code; for R-15 insulation, 4 points; for R-19 or higher insulation, 6 points.

Compliance: Inspected. (3: Insulation)

5.14 Insulation Under Heated Slab

2 to 3 Points

For heated slabs-on-grade, provide location of insulation of slab in construction drawings: for levels above continuous R-5 minimum insulation: continuous R-10 minimum insulation, 2 points; for continuous R-15 minimum insulation, 3 points.

Compliance: Inspected. (1: Foundation)

5.15 Insulate all hot water pipes at all locations R-2 or higher

2 Points

Insulating hot water pipes reduces heat loss through the plumbing system. Closed cell foam or fiberglass pipe insulation must be installed on all hot water pipes at a minimum R-2 value. Leave clearance space for gas heater exhaust.

Compliance: Inspected. (3: Insulation)

5:16 Insulate Hot water pipes with R-6 in all unconditioned spaces 2 Points

Significant heat loss can occur from hot water pipes in crawlspaces or attics. Pipe insulation is a cost effective way to save energy.

5.17 Blown or sprayed insulation 8 Points

Blown or sprayed insulation reduces air infiltration and offers higher effective R values than batt insulation. Blown insulation installed in more than 50 % of exterior surfaces- attics/ceilings, walls and basements/crawlspaces .

Compliance: Inspected. (3: Insulation)

5.18 Water heater(s) wrapped with R-5 or above 1 Point

Insulating water heaters reduces heat loss of hot water storage, is simple and inexpensive, and offers a rapid return on investment for energy savings. Tankless water heaters not applicable. All water heaters must be wrapped in order to qualify. Note: some gas water heater manufacturers do not recommend insulating wraps for their water heaters.

Compliance: Inspected. (5: Final)

5.19 R- 5 Exterior doors 1 Point

Insulated and sealed exterior doors reduce heat loss.

Compliance: Inspected . (4: Rough in)

5.20 No Recessed lights in cathedral ceilings 2 Points

Recessed lighting in exterior ceilings, exposed to outside air, can allow for thermal leakage, both from reduced insulation and air leakage.

Compliance: Inspected. (3:Insulation)

MECHANICAL EQUIPMENT- EFFICIENCY MEASURES

5.21 Mechanical equipment centrally located 1 Point

Locate mechanical equipment within the middle third (1/3) of the distance of the longest horizontal diagonal.

Compliance: Inspected (PC: Plan Check).

5.22 Manual J calculations used for sizing mechanical equipment 3 Points

Oversizing mechanical equipment wastes energy as equipment cycles on and off. ACCA Manual J 8th edition or most current (or equivalent) shall be used to determine correct size of mechanical equipment.

Compliance: Inspected (PC: Plan Check). Submit calculations with checklist.

5:23 Thermostats for each room 2 Points

To qualify for the 2 points, each enclosed room must have a separate thermostat, not including storage areas, closets, bathrooms, mechanical rooms, or non-habitable space.

Compliance: Inspected (5: Final).

5:24 Programmable thermostats 1- 2 Points

Thermostats that automatically change programmed temperature settings must be installed and be functional. Not to be used for radiant in floor systems. One point for each programmable thermostat installed, maximum 2 points.

Compliance: Inspected (5: Final).

5.25 Efficient Boiler or Furnace 5-10 Points

Install a boiler and/or furnace with a (combined) AFUE rating of 88% for 5 points or for systems reaching 92 % efficiency, 10 Points is given.

Compliance: Inspected (4: Rough- in).

5.26 Radiant floor/hydronic baseboard heating system 2 Points

Either in-floor radiant heat or baseboard hydronic heat qualifies as long as over 50% of the heating needs of the structure are met by hydronic means. Show system detail on construction plans.

Compliance: Inspected (4: Rough- in).

5.27: Side arm hot water heater or indirect coil from a boiler or tankless on-demand water heater(s) for domestic hot water use 3 Points

Units must have an intermittent ignition device (IID) instead of a standing pilot light to qualify. Efficient gas conventional water heaters also help save energy. Tankless hot water heaters may use natural gas or electricity as heating source.

Compliance: Inspected (5: Final).

5.28 Air to air heat exchanger

4 Points

An air-to-air heat exchange captures potentially lost warm or cool air while ventilating interior space. Heat exchanger may be used as mechanical ventilation see Section 4.17, count points for both Sections (5.28 and 4.17)

Compliance: Inspected (5: Final).

DUCTING/ AIR CONDITIONING/HVAC

5.29 All duct work sealed with mastic

REQUIRED

Delivery of heated or cooled air to where it is needed in a home requires proper sealing of ductwork, use mastic for superior performance. Forced air systems only.

Compliance: Inspected (4: Rough in).

5.30 All duct work sealed with low VOC mastic

2 Points

Compliance: Inspected (4: Rough in). Documentation of Low VOC mastic required.

5: 31 No ductwork in unheated spaces or duct work insulated to R-8 in unconditioned spaces

Ductwork insulated to R-8 minimum in unconditioned space 1 Point

No ductwork in unconditioned spaces 3 Points

Whenever possible, running ductwork through unconditioned space, especially attics, should be avoided. It creates a potential for heat loss and moisture problems. However, if it is not avoidable, all ductwork should be properly sealed at all joints with mastic and insulated to a minimum R-8.

Compliance: Inspected (4: Rough- in).

5:32 Fully ducted system

REQUIRED

If a ducted system is installed all supply and return ducts must be fully ducted. No panned spaces or building spaces can be used or modified to be used as ducts. Install all ducts.

Compliance: Inspected (**4:** Rough- in).

5.33 No mechanical air conditioning (A/C) or use evaporative cooling **5 Points**

Due to our dry weather patterns and low number of Cooling Degree Days, most houses do not use mechanical air conditioners. Evaporative cooling is an acceptable cooling alternative to mechanical air conditioning and uses 10% of the electricity used in air conditioning systems.

5.34: Mechanical air conditioning installed **minus 4 Points**

Through proper design of building aspect, window sizing and placement, overhang shading, and insulation, air conditioning systems are unnecessary in our climate. Eliminating the need for air conditioning offers an immediate initial cost savings as well as reduced operational costs for the life of the structure. Projects installing mechanical air conditioning will receive minus 4 points. Section 5.22 required.

Compliance: Inspected (**5:** Final).

5.35 Mechanical A/C with minimum 15 SEER system **2 Points**

Since January 2006, minimum SEER is 13 for all A/C systems manufactured in the U.S. Choose a more efficient, higher SEER system for operational savings over the system life time. Supply ARI certificate with SEER in the inspection container. Section 5.22 required.

Compliance: Inspected (**5:** Final).

COOLING STRATEGIES

5.36 Overhangs **2 Points**

Provide properly sized overhangs for blocking solar gain in the summer on south windows. See section 6.4

Compliance: Inspected (**PC:** Plan Check and Final)

5.37 Reduce heat gain in summer

2 Points

On east and west facing windows, either use windows with a SHGC, Solar Heat Gain Coefficient of .40 or less or install reflective films to reduce heat gain in summer. Reduce the amount of west facing glass to avoid overheating.

Compliance: Inspected (**4:** Rough-in). Check the NFRC window stickers or see film specs in the inspection container.

5.38 Ceiling fans/air destratification system in common rooms

1 Point

Installation of a ceiling fan or air handling system helps to cool spaces in summer and reduces the accumulation and escape of warm air through the ceiling during the winter. Show units/systems in construction plans,

Compliance: Inspected (**5:** Final).

5.39: Installation of whole-house fan natural cooling/ventilation system

2 Points

Whole-house fan natural cooling/ventilation systems are installed in ceilings and attic to help cool a structure by flushing warm air from inside living space as well as the attic. Such ventilation systems can help reduce or eliminate air-conditioning cooling loads. Systems must be installed and operable manually and by automated thermostat. Fans should be sized to produce between 4-5 air changes per hour (ACH) at maximum speed. For design purposes, use the following formula:

Minimum fan CFMs = Volume of house times 4-5 ACH divided by 60; where Volume = square footage of house interior times average ceiling height.

Provide an insulated R-19 cover for winter protection.

Compliance: Inspected (**5:** Final).

WINDOWS/OTHER

5:40 Insulating window coverings installed

4 Points

Windows, even high performance models, are still typically the largest point of heat loss in walls. By utilizing insulating window coverings, a window's thermal performance can be doubled or tripled. Window coverings must be properly installed and have a minimum R-3 to qualify. Some common options are duet/cellular shades, or quilted shades. Install on 75% of windows.

Compliance: Inspected (**5:** Final). Must be installed.

5:41 Unheated Air Lock Entry

2 Points

A significant amount of heat loss can occur when an exterior door is opened into a heated space. By incorporating an airlock space with an interior door creating a space that acts as a vestibule, this heat loss can be minimized.

Compliance: Inspected (5: Final).

ELECTRICAL

5.42 Energy Star appliances

2 to 8 points

Use any appliances with the EPA's Energy Star logo on them and/or appliances listed on www.energystar.gov website qualify. Units must be installed and operable. Field inspected. Two points per appliance.

Compliance: Inspected (5:Final) Check for Energy Star labels in appliances.

5.43 Dimmers installed

1 Point

Install dimmers on 4 fixtures for one point and save energy using the dimmers.

Compliance: Inspected (5: Final).

5.44 House Dimming System

2 Points

Systems for automatic control of lighting can be used for dimming, and contain time clock and programming capability for vacation mode. Use the system to save energy and help reduce light pollution in your neighborhood.

Compliance: Inspected (5: Final).

5.45 Occupancy/Motion sensing light switches

1 to 4 Points

Lighting that operates by occupancy or motion detection saves energy and increases safety. Motion detection lighting is ideal for exterior uses, and interior spaces, bathrooms, closets, basements. These switches come either as an integrated unit or by a remote motion sensor. One point is given for each motion detection switch installed, up to 4 points. .

Compliance: Inspected (5: Final).

5.46 Efficient lighting

2 Points

Efficient lighting must be installed in 10% of fixtures. Install lighting that uses 20% or less wattage as incandescent lighting for equivalent lumens. Hard wired T8s, T5s, LEDs or equivalent comply.

Compliance: Inspected (5: Final).

5.47 CFL – Compact Fluorescents

1-2 Points

Install CFLs in lighting fixtures, 1 point for every 4 bulbs installed, maximum of 2 points.

Compliance: Inspected (5: Final).

5.48 Airtight J Boxes

2 Points

Reduce air infiltration through electrical boxes; use air tight boxes on all exterior walls for improved energy efficiency.

Compliance: Inspected (4: Rough -in).

5.49 Interior lighting

1 Point

Consider ways to reduce bright light spilling from inside your home into the outside environment to be a good neighbor. Curtains, shades, proper placement of fixtures and low light levels at night can help reduce light pollution.

Compliance: Provide a letter stating applicant will meet the intent of this item. .

15.30.130 Solar Energy (Section 6)

6.0 General Description:

Section 6 should be reviewed with Section 9.1 On site requirements for houses over 3000 square feet.

6.1 Prerequisite:

Site should have reasonably unobstructed solar access from the south from 10 AM to 2 PM. Site plan must show accurate North Arrow.

6.2 Rough-in for future solar hot water preheat and solar electric REQUIRED

Solar hot water- Rough In Only

REQUIRED

Two runs of copper plumbing pipe minimum 3/4", insulated, minimum R-6, must be installed in an interior wall and start in the mechanical room or near the area that will

house the storage tank/heat exchanger. The plumbing should terminate in an attic space under the roof that will support the solar collectors, and it shall be above the insulation for easy sighting. If there isn't an attic space, the piping shall end after penetrating the roof that will support the collectors. In the mechanical room, identify 10 sq.ft. for future preheat tank.

Solar Electric Rough- In Only

REQUIRED

Install minimum 3/4 inch conduit from future site for solar electric to service panel or room for utilities.

Compliance: Inspected. (4: Rough in)

6.3 Sun tempered Design:

5 Points

In our climate 10-15% of a homes heating energy can be obtained by moving some of the home's windows to the south side of the house. Install south-facing (at least within 30 degrees of true south) glass, equivalent to 6-7% of total above grade heated floor area. On plans show calculation of area of south glass divided by total heated floor area.

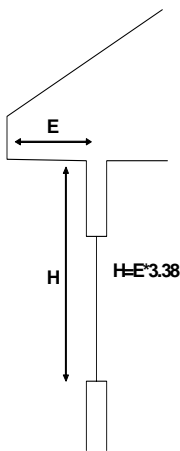
Compliance: Inspected at plan review.

6.4 Passive solar design

5-10 Points available

Effective passive solar design allows for south-facing solar heat gain and heat storage in thermal mass of the interior during the winter, while properly shading south-facing windows to prevent unwanted heat gain during the summer.

Passive solar design for enhanced performance:



Install south-facing glass equivalent to 7- 12% or more of total above grade heated floor area, and provide proper shading according to the figure to the left, where E= eave width, H=height of bottom of window from the eave, and $H=E*3.38$, or conversely, $E=H/3.38$. Show calculations on the plan. **Compliance:** Inspected. (PC)

Additional 5 points

For each square foot of south-facing glass, provide at least thermal mass in interior walls and/or floor reached by the solar gain. Types of thermal mass which qualify include concrete floors, double-layered sheetrock, gypcrete, tile, masonry, CMUs, adobe, stone. **Compliance:** Inspected (5: Final). **Additional 5 points**

6.5 Solar hot water system for domestic hot water

only 8 Points

Solar hot water system also serves for heating

4 addition Points

Install a solar hot water system, which includes rooftop or ground-mounted panel collectors connected to a heat exchanger and/or insulated storage tank for domestic hot water supply. System must have unobstructed solar access. Systems may be active, using solar or electric pumps, or they may utilize a thermal siphon. Collectors must be facing within 20 degrees of true south, and between 30 and 60 degrees from horizontal. See Section 9 for On-site requirements. System size is dependent on number of bedrooms:

1 bedroom – 40 square feet of collectors, 50 gallons storage

2 bedrooms – 48 square feet of collectors, 60 gallons storage

3 bedrooms – 64 square feet of collectors, 80 gallons storage

4+ bedrooms – 96 square feet of collectors, 120 gallons storage

Integrated solar hot water system that supplements both radiant floor heat and domestic hot water

Total 12 points

Install a solar hot water system sized as previous that provides heat for radiant floor heating as well as domestic hot water. Show system in construction plans and schematics. Distribute solar heat to a heat exchanger and/ or insulated storage tank in order to meet part of the winter heating load. Area of solar collectors shall be 5-7% of total heated floor area. No more than 320 square feet of collector shall be installed on a house. The collectors for the solar system must be mounted with a minimum slope from the horizontal of 40 degrees.

Compliance: Inspected (5: Final).

6.6 On-site solar electric or photovoltaic

5- 50 Points

Solar electric system

Obtain 5 points for every 0.5 Kilowatt (KW) installed up to 50 Points (5 kW). For example: 2 kW= 20 points, 4 KW = 40 points. Partial points offered for systems not reaching the .5KW increments. For example: 3.1 KW equals 31 points.

Photovoltaic panels should be mounted within 30 degrees of true south and between 20 and 50 degrees from horizontal to receive full credit for KW capacity. System must have unobstructed solar access. Applicant must submit plans from a qualified architect, engineer, or COSEIA certified designer, certifying the KW capacity, and proper system design. Proper protection as per code and prevention of electric islanding must be in place in the event on a power outage.

Systems with designs that are not within the orientation parameters must show efficiency of system more than 70% as per the “solar orientation chart”. Solar orientation chart is in the appropriate section in the Resource Guide. These systems can receive partial credit but the KW capacity must be adjusted for efficiency. For example: nameplate 4KW times 75% efficiency= 3 KW.

Compliance: Inspected (5: Final).

15.30.140 Innovation Points (Section 7)

7.1 Innovation Points

1-20 Points

Innovative product use and/or design will be given points on a case by case basis. The item must specifically meet the intent of the CEB code as stated at the beginning of this document, and points will be scaled as the item would apply to similar comparable sections in the code. Criteria for points granted will be made available.

Some options eligible for Innovation Points may include but are not limited to:

Energy 10 Analysis, American Lung Association-certified home, modulating or sequential staged boilers, sun rooms, net-zero energy home, pervious materials in hardscape areas, trombe wall/interior thermal massing systems, evapo-transpiration watering system.

7.2 Ground source heat pump (geothermal) system

20 Points

Ground source heat pumps utilize glycol loop systems drilled into the ground to heat or cool a structure. Also provides heat and hot water for your home. Minimum COP as per ARI guidelines must be minimum 3.3. System design must cover the heat load of the residence.

Compliance: Inspected at 4: **Rough In-** ARI Certificate required documentation.

7.3 Deconstruction/Reuse of Materials

1 to 10 Points

In cases of scrape offs or remodels, deconstruction of structures should be considered. Materials can be donated to organizations such as Habitat for Humanity for reuse or sale. The number of points is dependent on the amount of deconstruction material donated. Donated/reused value of \$5000 equals 10 points.

Compliance: Documentation required: donated value receipt from non-profit organization. (Inspection for receipt 4: **Rough-In**)

7.4 Deconstruction/Grinding

5 Points

In cases of scrape offs or remodels, deconstruction or grinding of waste should be considered. The number of trips to the landfill can be significantly reduced and wood waste can be recycled for use as compost material at either South Canyon or Pitkin County. Other materials such as metals can also be recycled.

Compliance: Documentation required: receipt for recycling and/or grinding operation (Inspection for receipt **4: Rough-In**)

7.5 Approved EPA Wood Stove or Pellet Stove 5 Points

Wood and pellet stoves are considered a carbon-neutral energy source. Only one stove per house type unit is permitted and a separate permit must be requested from Building Department prior to installation (*see* Chapter 15.05.035 Wood Burning Stoves). Houses or units with this type heating for primary or supplemental heating require an Energy Star test and HERS rating of 80 or less. Test results must be submitted prior to permit approval for stove installation. Permissible solid fuel burning devices may emit no more than (i) 2.5 grams of exhaust per hour for catalytic stoves, or (ii) 4.0 grams of exhaust per hour for non-catalytic stoves and be on the EPA list of approved devices. All solid fuel burning devices must incorporate exterior combustion air ventilation that complies with Section 703 of the International Mechanical Code (IMC), as defined in Article 16-5 of the Town Code. Ducting for solid fuel burning devices must be fitted with back draft dampers. All applications for solid fuel burning devices shall reflect the applicant’s compliance with the foregoing requirements.”

Pellet stove utilize a salvage/recycled renewable fuel source, are clean burning, cost effective, more energy efficient, than regular wood burning stoves.

Compliance: Inspected (PC) Plan check and **5:** Final.

15.30.150 Alternative Points (Section 8)

8.1 CASH IN LIEU maximum of 10 % of Required Points

Projects may pay a fee instead of scoring points. The maximum amount of points per checklist is 10% of total required points. Fees are calculated using the checklist. In general the fee structure for points increases with increasing house size. Some examples of maximum points and cost for maximum points and cost per point is shown below:

Total Square Footage	Maximum Points Allowed for Cash in lieu	Fee for maximum number of points	Cost per point
3000	12	\$3000	\$250

5000	15	\$5000	\$333.33
7000	20	\$10,000	\$500
10,000	23	\$20,000	\$869.56

15.30.160 On-site Renewable Energy and Exterior Use (Section 9)

9.1 Size requirement for renewable energy installation

Residential construction with total square footage over 3000 square feet as defined in “Applicability” are required to install a small renewable energy system on site or pay a fee. Options for complying with minimum renewable energy system are:

- 2 panel solar hot water for domestic hot water for houses between 3000-5000 square feet
- or solar electric system for houses over 3000 square feet
- or pay a fee
- or other system exceeding this performance.

The solar electric system or fee payment is applied as per the CEB checklist calculations. If the applicant can not use the electronic version of the checklist, the size of the solar electric system option or fee can be interpolated from the examples below. The fee structure and on-site renewable energy options are graduated except for the solar hot water option. Some examples of fees or solar options are as follows:

Size square feet	On-site Requirement	Fee Option
3000	2 Panel Solar Hot water or 1 KW solar electric	\$3,000
5000	2 KW solar electric	\$7,000
7500	3 KW solar electric	\$13,500
10,000	4 KW solar electric	\$20,000

The solar systems installed on site for house size requirements will also count towards points required for CEB checklist.

9.2. Exterior Uses of Energy

This code considers exterior energy uses over a nominal amount as identified below. In order to offset the exterior use of energy, the use must be mitigated with renewable energy on-site or the applicant has an option to pay a fee. Fees are based on average BTUs required for such amenities over a 20-year period in our climate. Fees are exempted if renewable energy system(s) are installed on-site which generate the equivalent of 50% of the energy needed for the use. On-site system design and calculations required. Designs must be approved by the Community Development Department, in consultation with the Community Office for Resource Efficiency (CORE), until standards are developed and adapted to the CEB checklist.

Exterior energy fees would apply exclusively to residential projects as follows:

Energy Use	BTUs per sq. ft. per year	“Free allowed square footage” per unit	Fee per square foot above “free allowed”
Snowmelt	34,425	200	\$14
Small Spa	430,000	64	\$176
Summer Pool	29,000	200	\$12
Winter Pool	332,000	None	\$136
Heated Garage	19,500	None	\$8

For example, if 500 square feet of snowmelt was proposed on a residential property, where 200 is exempt, then 300 square feet x \$16 per square foot = \$4800.

Maximum amount of allowable exterior energy used is 240,000,000 BTU or purchased is \$100,000.

All calculations must be submitted at time of permit. On site renewable energy systems installed for exterior energy do not count towards required point total.

15.30.170 Efficient Building Checklist

LEGEND							
POSSIBLE POINTS							
P - Prerequisite (These measures must be achieved for the subsequent points to be earned.)							
TIME OF VERIFICATION							
D - Documentation must be supplied at the time of verification to support the point scored for this Code Section.							
PC - Plan Check - Item is verified at the time the plans are review code compliance prior to issuance of permit.							
1 - Foundation Inspection							
2 - Framing Inspection							
3 - Insulation Inspection							
4 - Rough-in Inspection							
5 - Final Inspection							
NOTE!							
Please read the CEB Guidelines prior to completing the Checklist. The CEB Guidelines serve as the official code document for this program.							
QUANTITY/ CHECK	SCORE	POSSIBLE POINTS	CODE SECTION	CODE DESCRIPTION	TIME OF VERIFICATION	VERIFICATION SIGN-OFF & DATE	
1.0 SITE/LAND USE AND WATER CONSERVATION							
		2	1.1	Construction plan does not impact site 15 feet outside building footprint.	PC-1		
		2	1.2	100% of topsoil saved and reused on site.	1		
		2	1.3	Save and reuse all excavated fill on site.	1		
		1		Save and reuse all excavated fill off site within 3 mile radius of the site.	D-1		
		8	1.4	House size less than national average.	PC		
		1	1.5	Erosion controls during construction.	1		
		1	1.6	Planting deciduous trees/ large shrubs to provide summer shade on west side of structure.	PC-5		
Xeriscape Landscaping							
		1	1.7	Addition of organic material to soil or use 2" of mulch/ bark on all planting beds.	5		
		3	1.8	Turf limited - 25% of landscaped area or 2000 sq. ft. which ever is less.	PC-5		
		5	1.9	Xeriscape.	PC-5		
		1	1.10	Provide education on low water plants and list of Xeriscape plants.	D-5		
Irrigation system							
		2	1.11	Non-potable water used for irrigation.	PC		
		2	1.12	At least 50% of landscaped area has a drip irrigation system.	D-5		
		2	1.13	Zoned irrigation system.	D-5		
		REQUIRED	1.14	Timer/controller installed to activate zoned valves for irrigation at night.	D-5		
		2	1.15	Rain sensor installed on irrigation system.	D-5		
Water conservation							
		1-4	1.15	High efficiency dual flush toilets. High efficiency <1.4 gpm toilets.	D-5		
		1	1.16	Low flow shower heads <2gpm & no more than one spray head per shower.	D-5		
		1	1.17	Hot water recirculating pump with temperature sensor/timer.	D-5		
		3	1.18	Energy Star® water efficient clothes washer.	5		
		0	41	Sub Total			
2.0 RECYCLING AND REUSE							
		2-8	Recycled Materials. (2 points per material)				
		2	2.1	Wood	1-5		
		2		Metal			
		2		Cardboard			
		4	2.2	Use of beetle kill pine/spruce wood for structural applications.	D-2		
		2		Use of beetle kill pine/spruce wood for Non-structural applications.			
		2	2.3	Use of compost, from local landfills, for landscaping.	D-5		
		3	2.4	20% or more fly ash content in over 50% of concrete used.	D-2		
		2	2.5	Use recycled concrete or asphalt - Class 6 locally available.	D-5		
		2-8	Reclaimed content material used. (2 points per material)				
		2	0.1	Material:	D-4		
		2		Material:			
		2		Material:			
		2		Material:			
		2-8	Recycled content material used. (2 points per material)				
		2	0.2	Material:	D-4		
		2		Material:			
		2		Material:			
		2		Material:			
		3	0.3	Built-in kitchen recycling center to include two or more bins.	5		
		0	36	Sub Total			

LEGEND						
POSSIBLE POINTS						
P - Prerequisite (These measures must be achieved for the subsequent points to be earned.)						
TIME OF VERIFICATION						
D - Documentation must be supplied at the time of verification to support the point scored for this Code Section.						
PC - Plan Check - Item is verified at the time the plans are review code compliance prior to issuance of permit.						
1 - Foundation Inspection						
2 - Framing Inspection						
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NOTE!						
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QUANTITY / CHECK	SCORE	POSSIBLE POINTS	CODE SECTION	CODE DESCRIPTION	TIME OF VERIFICATION	VERIFICATION SIGN-OFF & DATE
1.0 SITE/LAND USE AND WATER CONSERVATION						
		2	1.1	Construction plan does not impact site 15 feet outside building footprint.	PC-1	
		2	1.2	100% of topsoil saved and reused on site.	1	
		2	1.3	Save and reuse all excavated fill on site.	1	
		1		Save and reuse all excavated fill off site within 3 mile radius of the site.	D-1	
		8	1.4	House size less than national average.	PC	
		1	1.5	Erosion controls during construction.	1	
		1	1.6	Planting deciduous trees/ large shrubs to provide summer shade on west side of structure.	PC-5	
Xeriscape Landscaping						
		1	1.7	Addition of organic material to soil or use 2" of mulch/ bark on all planting beds.	5	
		3	1.8	Turf limited - 25% of landscaped area or 2000 sq. ft. which ever is less.	PC-5	
		5	1.9	Xeriscape.	PC-5	
		1	1.10	Provide education on low water plants and list of Xeriscape plants.	D-5	
Irrigation system						
		2	1.11	Non-potable water used for irrigation.	PC	
		2	1.12	At least 50% of landscaped area has a drip irrigation system.	D-5	
		2	1.13	Zoned irrigation system.	D-5	
		REQUIRED	1.14	Timer/controller installed to activate zoned valves for irrigation at night.	D-5	
		2	1.15	Rain sensor installed on irrigation system.	D-5	
Water conservation						
		1-4	1.15	High efficiency dual flush toilets.	D-5	
				High efficiency <1.4 gpm toilets.		
		1	1.16	Low flow shower heads <2gpm & no more than one spray head per shower.	D-5	
		1	1.17	Hot water recirculating pump with temperature sensor/timer.	D-5	
		3	1.18	Energy Star® water efficient clothes washer.	5	
		0	41	Sub Total		
2.0 RECYCLING AND REUSE						
		2-6	2.1	Recycled Materials. (2 points per material)	1-5	
		2		Wood		
		2		Metal		
		2		Cardboard		
		4	2.2	Use of beetle kill pine/spruce wood for structural applications.	D-2	
		2		Use of beetle kill pine/spruce wood for Non-structural applications.		
		2	2.3	Use of compost, from local landfills, for landscaping.	D-5	
		3	2.4	20% or more fly ash content in over 50% of concrete used.	D-2	
		2	2.5	Use recycled concrete or asphalt - Class 6 locally available.	D-5	
		2-8	0.1	Reclaimed content material used. (2 points per material)	D-4	
		2		Material:		
		2		Material:		
		2		Material:		
		2		Material:		
		2-8	0.2	Recycled content material used. (2 points per material)	D-4	
		2		Material:		
		2		Material:		
		2		Material:		
		2		Material:		
		3	0.3	Built-in kitchen recycling center to include two or more bins.	5	
		0	36	Sub Total		

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QUANTITY / CHECK	SCORE	POSSIBLE POINTS	CODE SECTION	CODE DESCRIPTION	TIME OF VERIFICATION	VERIFICATION SIGN-OFF & DATE
3.0 FRAMING & MATERIALS						
Incorporate optimal value engineering (OVE) framing techniques						
		3	3.1	24" O.C. studs for over 50% of the structure.	2	
		2	3.2	Insulated Corners.	2	
		1	3.3	All closet headers flat framed.	2	
		2	3.4	Structural/framing dimensions in 2 feet increments. (75% of footprint)	PC	
		1	3.5	Single trim windows.	2	
Structural Elements						
		2	3.6	Engineered I-joists used in floors.	2	
		2	3.6	Engineered I-joists used in roofs.	2	
		2	3.7	Engineered lumber used for structural applications, ≥ 75% structural material.	2	
		10	3.8	Strawbale or Structural Insulated Panels (SIP's) used for exterior walls.	2	
		2	3.9	Pre-cut studs.	2	
		2	3.9	Pre-fabricated trusses.	2	
		4	3.10	Panelized walls and/or sections for 50% of construction.	2	
		3	3.11	Finger-jointed studs or engineered studs for more than 50% of wall framing.	2	
Efficient Materials						
		2	3.12	Oriented Strand Board in sub floors and/ or sheathing for at least 50% of materials used.	2	
		1-8	3.13	Materials manufactured in Colorado or rapidly renewable content. (1 point per material)	D-4	
		1	Material:			
		1	Material:			
		1	Material:			
		1	Material:			
		1	Material:			
		1	Material:			
		1	Material:			
		2	3.14	30 year roofing material or >75% recycled steel roofing.	D-5	
		3	3.15	Aerated Concrete Blocks.	D-5	
		3	3.16	Fiber Cement, Stucco or Recycled Siding used for on over 50% of wall surfaces.	D-5	
FSC or SFI certified material						
		4	3.17	SFI - Sustainable harvested lumber for at least 50% of framing material.	D-2	
		8	3.18	FSC - Sustainable harvested lumber for at least 50% of framing material.	D-2	
		2-6	3.19	Sustainable certified trim and/or flooring. (2 points per application)	D-5	
		2	Trim			
		2	Flooring			
		2	3.19	Other		
		4	3.20	FSC certified cabinets.	D-5	
		2-6	3.21	Sustainable certified. (2 points per application)	D-5	
		2	Windows			
		2	Doors			
		2	3.21	Outdoor Structures		
Foundation Elements						
		3	3.22	Non-solvent based foundation waterproofing on 100% of foundation walls.	1	
		4	3.23	Choose Efficient Insulated Concrete Forms (ICF's) for crawl space and/ or basement.	1	
		2	3.24	Efficient precast concrete wall foundation system.	1	
		2	3.25	Recycled-content Insulated Concrete Forms (ICF's) used.	D-1	
		3	3.26	Frost-protected shallow foundation for more than 50% of the perimeter.	1	
		3	3.27	Unvented Crawl Space.	1	
		3	3.28	Controlled ventilated Crawl Space.	3	
0		102	Sub Total			

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QUANTITY / CHECK	SCORE	POSSIBLE POINTS	CODE SECTION	CODE DESCRIPTION	TIME OF VERIFICATION	VERIFICATION SIGN-OFF & DATE
4.0 IMPROVED INDOOR AIR QUALITY						
Chemical reduction- choose at least one						
	4	4.1	Formaldehyde-free or low-toxic insulation for $\geq 50\%$ of all insulation.	3-D		
	2	4.2	Low VOC or zero VOC and/or low-toxic interior paint.	5-D		
	2	4.3	Water based lacquers and water based finishes on woodwork.	5-D		
	2	4.4	Use low VOC adhesives.	5-D		
	2	4.5	Low-toxic Oriented Strand Board (OSB) for at least 50% of OSB used.	D-2		
	2	4.6	Low or non toxic floor coverings.	D-5		
	2	4.7	Elimination of all particleboard inside envelope of house.	4		
	1		All particleboard sealed.			
	1	4.8	Ducts sealed off during construction.	3		
Mechanical systems- choose at least one						
	2	4.9	No attached garage or exhaust fan to exterior on automatic timer in attached garage.	5		
	2	4.10	Reduce point source pollution - exhaust range hood & bathroom fans to exterior.	5		
	1-2	4.11	Energy Star [®] quiet exhaust fans, less than 1.0 Sone. (1 point per fan)	5		
	3	4.12	Carbon monoxide detector - hard wired outside sleeping areas.	5		
	2	4.13	High efficiency pleated air (HEPA) filter in air handler or HEPA - Carbon filter system.	5		
	3	4.14	Rough-in for radon mitigation passive vented system.	5		
	1	4.15	Sealed mechanical room - No free exchange of air between house and boiler room.	5		
	4-8	4.16	Sealed combustion gas boiler/furnace(s).	5		
	2	4.17	Sealed combustion gas hot water heater(s).	5		
	2	4.17	Mechanical Ventilation for fresh air supply (see item 5.28) for sizing required see code document	5		
	0	44	Sub Total			
5.0 ENERGY MEASURES						
Energy Performance- use one method- check one 5.1-5.3						
	R	5.1	Submit REScheck report with "Pass" compliance for Carbondale IECC 2003 with permit application & attach copy of REScheck report to on-site permit for the inspector.	PC		
	R	5.2	HERS rating of 100 or less (E- Star Colorado rating or equivalent).	PC-5		
	R	5.3	Prescriptive code from International Residential Code 2003 - letter confirming compliance.	PC		
Performance better than code						
	1-10	5.4	REScheck report -1 point per 1% improvement.	PC		
	10	5.5	Energy Star [®] 4+ rating or HERS rating of 80 or less; no points for 5.4	PC-5		
	10	5.6	Energy Star [®] 5 or HERS rating of 70 or less; plus points for 5.5	PC-5		
	3	5.7	Blower Door only - must show ACH 0.35 or less. (item 4.18 or 5.28 required)	5		
Efficient Envelope - Insulation measures						
	2	5.8	Insulated headers (R-10 min.) installed on all exterior walls.	2		
	3	5.9	Raised Heel Trusses. (R-38 minimum with 12 inch minimum heel)	2		
	1-11	5.10	Roof/ceiling insulation. (1 point for each R-value above R-value 49; with RH truss above R-38)	3		
	1-10	5.11	Wall insulation. (1 point for each R-value over 19)	3		
	3	5.12	Continuous insulation on exterior walls R-3.5 or more.	3		
	2-4	5.13	Crawl space or basement walls/ exterior perimeter insulation value R-10 to R-15 = 2 points, R-19+ 4 points.	3		
	1-3	5.14	Heated slab insulation. (R-10 = 2 points & R-15 = 3 points)	3		
	2	5.15	All hot water pipes to all locations wrapped with R-2 insulation.	3		
	2	5.16	R-6 insulation on hot water pipes in unconditioned spaces.	4		
	8	5.17	Blown or spray insulation for $\geq 50\%$ of all insulation.	3		
	1	5.18	Water heater wrapped with \geq R-5 insulation.	5		
	1	5.19	R-5 insulated Exterior Doors.	D-4		
	2	5.20	No Recessed Lights in cathedral ceilings exposed to outside air.	3		
Mechanical equipment- Efficiency measures						
	1	5.21	Mechanical equipment centrally located.	PC		
	3	5.22	ACCA Manual J 8th edition (or most current) used for sizing mechanical equipment.	PC		
	2	5.23	Thermostats in each habitable room, except bathrooms.	5		
	1-2	5.24	Programmable thermostats, except for radiant systems. (1 point for each)	5		
	5-10	5.25	88% (min.) efficient boiler or furnace - 5 points \geq 92% efficiency 10 points	5		
	2	5.26	Radiant floor and/or hydronic for $\geq 50\%$ of the spaces.	5		
	3	5.27	Side arm hot water heater or tankless hot water heater.	5		
	4	5.28	Air to air heat exchanger (plus points for 4.18) (HRV or ERV)	5		

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QUANTITY/ CHECK	SCORE	POSSIBLE POINTS	CODE SECTION	CODE DESCRIPTION	TIME OF VERIFICATION	VERIFICATION SIGN-OFF & DATE
5.0 ENERGY MEASURES CONTINUED						
Ducting/Air-conditioning/HVAC						
		REQUIRED	5.29	Seal all ductwork with mastic.	3	
	2		5.30	All ductwork sealed with low VOC mastic.	3	
	1-3		5.31	No ductwork in unconditioned space or duct work insulated to minimum R-8 in unconditioned spaces.	3	
		REQUIRED	5.32	If ducted system: No panned joist spaces or building spaces used for return air; fully ducted system.	4	
	5		5.33	Use of a evaporative cooling system - No air conditioning A/C.	5	
	-4		5.34	Mechanical air conditioning (A/C) installed.	5	
	2		5.35	Mechanical A/C with minimum 15 SEER submit ARI certificate; item 5.22 required.	D-5	
Cooling Strategies						
	2		5.36	Overhangs to block summer sun.	PC	
	2		5.37	Reduce solar heat gain with windows in summer.	5	
	1		5.38	Ceiling fans or air desertification system(s) in common rooms.	5	
	2		5.39	Installation of whole house fan, with R-19 seasonal cover, for ventilational cooling.	5	
Windows/Other						
	4		5.40	Window quilts or insulated window shades installed on ≥ 75% of all exterior windows.	5	
	2		5.41	Unheated Entry Airlock.	5	
Electrical						
	2-8		5.42	Energy Star® appliances. (2 point for each appliance)	5	
	2			Appliance:		
	2			Appliance:		
	2			Appliance:		
	2			Appliance:		
	1		5.43	Dimmers on fixtures - Required to have a minum of four dimmers installed.	5	
	2		5.44	House dimming system with time clock and vacation modes.	5	
	1-4		5.45	Occupancy sensing light switches for exterior and/or interior lighting.	5	
	2		5.46	Install 10% of fixtures with hard wired fluorescent fixtures.	5	
	1-2		5.47	CFL - Compact Fluorescents Lamps 1 point for every 4 bulbs installed.	5	
	2		5.48	Airtight J boxes for all exterior walls.	3	
	1		5.49	Reduce interior light spillage to exterior.	4	
0	151		Sub Total			
6.0 SITE ORIENTATION AND RENEWABLE ENERGY						
	P		6.1	Solar access is unimpeded from 10-2 PM through-out the year for items 6.1-6.6	PC	
		REQUIRED	6.2	Rough in for preheat on solar hot water & solar electric as follows:	4	
				Solar Hydronic System - Rough in 3/4 inch return and supply and provide 10 ft. ² for future solar tank.	PC-4	
				Solar Electric - Rough in from roof to service panel & provide 6ft ² available near panel for future solar electric equipment.	PC-4	
	5		6.3	Sun tempered design.	PC	
	10		6.4	Passive solar design.	PC	
	8		6.5	Solar heating system for domestic hot water.	PC	
	4		6.5	Solar heating system for space heat.	PC	
	5-50		6.6	Solar Electric System 5 points for each 0.5 KW installed on site.	5	
0	77		Sub Total			
7.0 INNOVATION POINTS						
	1-20		7.1	Innovative product or design points.	PC	
	20		7.2	Ground source heat pump to cover at least 50% of heating load - COP of ≥ 3.3 ARI.	5	
	10		7.3	Deconstruction/Reuse.	PC-1	
	5		7.4	Deconstruction - Grinding and compaction for removal.	PC-1	
	5		7.5	Approved Wood Pellet or EPA certified wood stove - item 5.6 required.	5	
0	63		Sub Total			
8.0 ALTERNATIVE POINTS						
	0-13		8.1	Cash in-lieu of points.	4	
	0-13		Sub Total			

The Carbondale Efficient Building Checklist can be downloaded from the Town of Carbondale web site with Summary page to assist in compliance with Sections 8 and Sections 9.

SECTION 2: Except as set forth above, the Board of Trustees intends that all other provisions of the Municipal Code shall remain in full force and effect. If any part, section, subsection, sentence, clause or phrase of this Ordinance is for any reason held to be invalid, such decision shall not affect the validity of the remaining portions of this ordinance and the Board of Trustees hereby declares that it would have passed this Ordinance and each such part thereof regardless of the fact that any one or more provisions were declared invalid.

INTRODUCED, READ AND PASSED this ___ day of May, 2007.

THE TOWN OF CARBONDALE

Michael Hassig, Mayor

ATTEST:

Cathy Derby, Town Clerk