

Sec. 18-23 Sustainable Building Regulations

(a) Purpose. The intent of the Sustainable Building Regulations program for all new construction and some remodels, and reconstruction in the Town of Basalt is to encourage cost-effective 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.

The Building Official may prepare and maintain a SBR Commentary as defined herein to help administer the the Sustainable Building Regulations.

(b) Definitions:

Air Barrier - Materials assembled & joined together to provide a barrier to air leakage through the building envelope. An air barrier may be a single material or a combination of materials.

Biomass Fuel - Any plant-derived fuel available on a renewable or recurring basis, including agricultural crops and trees, wood and wood waste and residues (including wood pellets), plants (including aquatic plants), grasses, residues, and fibers.

Building component is one of the following: framing, wall, siding, flooring, trim, and other primary elements of a building as determined by the Town Building Official.

Building Thermal Envelope - The basement walls, exterior walls, floor, roof & any other building elements that enclose conditioned space or provide a boundary between conditioned space & exempt or unconditioned space.

Conditioned building area or space is the area in building, inside insulated walls, being heated or cooled, containing uninsulated ducts, or with a fixed opening directly into an adjacent conditioned space.

Construction element is one of the following: framing material, siding, flooring, trim, and other primary elements of a building as determined by the Town Building Official.

Continuous Air Barrier - A combination of materials & assemblies that restrict or prevent the passage of air through the building thermal envelope.

Continuous Insulation (ci) - Insulating material that is continuous across all structural members without thermal bridges other than fasteners & service openings. It is installed on the interior or exterior of is integral to any opaque surface of the building envelope.

Engineered lumber is a composite wood product made from pieces of recycled/reconstituted/scrap wood and fibers bonded together with adhesive to create a durable and resource friendly substitute for raw-sawn lumber.

Occupancy is the occupancy as designated by the building code in effect at the time of permit submittal.

Occupied Area - An area where one or more individuals normally spend time (more than three hours per person per day on average) seated or standing as they work, study, or perform other focused activities inside a building.

New Construction - refers to site preparation for, and construction of, entirely new structures and/or significant extensions to existing structures whether or not the site was previously occupied.

Performance - is one of the allowed paths under the International Energy Code for satisfying the requirements of that code. The definition used in this Article is the same as included in version of the International Energy Code adopted by the Town of Basalt.

Prescriptive - is one of the allowed paths under the International Energy Code for satisfying the requirements of that code. The definition used in this Article is the same as included in version of the International Energy Code adopted by the Town of Basalt.

Recycled content is the sum of post consumer recycled content plus one-half the pre consumer recycled content, based on cost.

Renewable energy source is incoming solar radiation and photosynthetic processes; natural phenomenon including wind, hydropower, and lake or pond thermal differences; from decomposition of waste material; and processes that use regenerative materials, including wood and bio-based products; and from the internal heat of the earth.

SBR Commentary - A document prepared by the Building Official to highlight and summarize knowledge and facts relating to the implementation of the Town's Sustainable Building Regulations. It may also include summaries of the IECC as the Town's Sustainable Building Regulations is built on the existing requirements and a knowledge of the IECC requirements is essential to successful

implementation of the Town's Sustainable Building Regulations. The Commentary may also include the list of eligible training opportunities.

Zero Energy Ready Home Program - means the program developed by the Department of Energy (DOE) which includes a robust set of guidelines to create high performance homes that conserve natural resources and have a limited impact on the environment, are healthy for occupants, comfortable and durable.

(c) SBR regulations address requirements for the following subjects which are used in both the Type I and the Type II Sustainability Building Regulations:.

- Part 1: Site/Water Conservation
- Part 2: Recycling and Reuse
- Part 3: Framing and Materials
- Part 4: Energy
- Part 5: Renewable Energy
- Part 6: Indoor Air Quality
- Part 7: Innovation

(d) Education Requirements: All applicants for a building permit subject to SBR I or SBR II Regulations within the Town of Basalt, including contractors and owner/builders, must provide documentation from the SBR program of completing 2 hours of eligible SBR training within the 18 month period preceding the building permit issuance subject to those SBR Requirements. This requirement will apply to all building permits submitted after January 1, 2019. The Building Official will maintain a list of eligible training opportunities. Applicants are allowed to submit proof of attendance at training events not on the list for review and approval by the Building Official and potential addition to the list of eligible training opportunities.

(e) Powers and Duties of the SBR Review Committee: A SBR Review Committee, made up of the Town Manager, Town Planner, Building Official, or their designee and a representative of CORE, has the authority to review and decide requests for interpretations and appeals of the SBR regulations. For more complex or significant reviews, the SBR Review Committee may refer the request to the Town Council for Action, or an applicant may appeal a decision of the SBR Review Committee to the Town Council utilizing the procedures established in Section 16-11 of the Zoning Code. Interpretations and exemptions shall be reviewed in accordance with the following standards and procedures.

1. Compliance with the purpose of intent of this Article.
2. Any special conditions, circumstances or hardships that warrant the exemption and/or appropriate conditions of approval

The SBR Review Committee may place reasonable conditions on an interpretation or exemption request. The applicant for a SBR Review shall pay and application fee and shall reimburse the Town for costs as provided in the Town's Fee Schedule.

Sec. 18-24 Type I Sustainable Building Regulations (SBR)

(a) Applicability. Type I SBR apply to:

- (1) All new single family, duplex and townhouse (attached single-family) construction
- (2) Additions of conditioned space of more than 500 square feet to single family, duplex and townhouse (attached single-family) units.
- (3) Conditioned building space being remodeled in single family, duplex and townhouse (attached single-family) units at Level 3 Category or greater per the International Existing Building Code (IECC) or remodels of conditioned space greater than 500 square feet that would meet the Level 3 Category except that they are less than 50 percent of the floor area of the building.
- (4) Exterior energy uses such as snowmelt, spas and pools over sixty-four (64) square feet or patio heaters.

Applicants for construction subject to the SBR Regulations must demonstrate ability to comply with the appropriate threshold level established by Subsection (c) below prior to building permit based on conditioned building area and must demonstrate ability to comply before any new construction, remodel or addition begins; this compliance must be verified prior to a certificate of occupancy or certificate of completion is granted by the Building Official.

Exterior energy uses subject to these requirements must be mitigated as outlined in Subsection 18-24 (e).

(b) Exceptions:

- (1) New Manufactured housing approved by Colorado Department of Housing; and which comes from plants certified to produce ENERGY STAR qualified manufactured homes on an ongoing basis. This process includes utilizing home designs that meet ENERGY STAR design guidelines.
- (2) One-story attached or detached accessory structures, provided that the floor area does not exceed 500 square feet.
- (3) Remodels that fall under the Level 1 & Level 2 Category per the International Existing Building Code.
- (4) Additions less than or equal to 500 square feet.
- (5) Exterior energy uses such as snowmelt, spas and pools of 64 square feet or less.

(c) **Mandatory Requirements and Optional Paths:** Building Permit Applicants must inform the building official at the time of building permit application which of the following paths will be used to satisfying the SBR I point thresholds:

- (1) Prescriptive which has the following subpaths: R-Value Table; U-value Table or Total UA Alternative/ResCheck.
- (2) Department of Zero Energy Ready Program: which has the following subpaths: ZER Prescriptive or Energy Rating Index/HERS. The Town's fee schedule provides for rebates in the building permit fee for this compliance path.
- (3) Performance which has the following subpaths: Energy Rating Index/HERS or Simulated Performance.
- (4) LEED Gold: Must achieve LEED for Homes Gold Certification or greater. The Town's fee schedule provides for rebates in the building permit fee for this compliance path.

Conditioned building space subject to Type I SBR must satisfy all IECC Mandatory Requirements for the path chosen by the Applicant. The conditioned building space must satisfy the point thresholds as shown below in Table 1 for each type of development subject to SBR Type I regulations. Only the additions of conditioned space or area being remodeled is subject to the Type I SBR requirements. In addition, for new residential homes of 1,000 or more square feet of conditioned space, developments must also satisfy minimum point thresholds for each of the seven parts summarized in Section 18-23 (c) as shown on Table 2. By way of example, a 1,500 SF Zero Energy Home must achieve 31 points of which 15 of those points must be obtained under Site/Water Conservation, and Applicants do not need points for Part 4 Energy or Part 5 Renewable Energy.

Min. Number of Points				Development Activity
Prescriptive	Performance	Zero Energy Ready	LEED for Homes Gold	
n/a	n/a	n/a	n/a	R1: Remodels - Level 1 under the IEBC
n/a	n/a	n/a	n/a	R2: Remodels - Level 2 under the IEBC
20	15	3	n/a	R3: Remodels - Level 3 under the IEBC and Otherwise Level 3 additions less than 50% of floor area and >500 square feet
20	15	3	n/a	A: Additions > 500 square feet
20	15	3	0	NC: 0-500 square feet *

58	33	21	0	NC: 501-1000 square feet *
68	43	31	0	NC: 1001 - 2000 square feet *
73	48	36	0	NC: 2001 - 3000 square feet *
78	53	41	0	NC: 3001-4000 square feet *
83	58	46	0	NC: 4001-5000 square feet *
				* Threshold levels increase 10 points for forced air conditioning

Note:

[1] the abbreviations used in the right column are used in the SBR Commentary prepared by the Building Official as referenced in Section 18-23 of these regulations. R stands for Remodels. A stands for additions. NC stands for New Construction.

SBR Type 1 - Table 2 Applicable to New Construction 1001 Square Feet and Greater								
	(1) Site/Water Conservation	(2) Recycling & Reuse	(3) Framing & Materials	(4) Energy	(5) Renewable Energy	(6) Indoor Air Quality	(7) Innovation	Min. Required Points
Prescriptive	15	6	10	25	0	12	0	68
Performance	15	6	10	0	0	12	0	43
Zero Energy Ready	15	6	10	0	0	0	0	31
LEED for Homes - Gold	0	0	0	0	0	0	0	0

(d) Type I Sustainable Building Regulations - Point Details

Information on the benefits of the tool used to satisfy the SBR point requirements, the qualification of what is required by the applicant and at what point in the building permit process compliance will be confirmed is provided in this subsection.

(1) Part 1: Site/Water Conservation

(a) Part 1.01: Limit Site Impact to fifteen (15) feet beyond building footprint

Benefit: Unaltered natural native vegetation outside of impacted construction area and driveway. Not applicable for previously impacted landscape.

Qualification: Show detailed construction management plan with sediment fence/limits of construction no more than 15 feet around proposed building footprint. Driveway and material storage exempted. Thinning required for wildfire mitigation is exempt. Show areas impacted by construction on landscaping plan.

Points: 3

Confirmation: Will be at plan review and foundation inspection.

(b) Part 1.02 Water Efficient Landscaping

Benefit: Reduces irrigation demands and conserves water.

Qualification:

- Limited Turf: Irrigated turf area must be equal or less than 40% of landscaped area, or 1000 square feet, whichever is smaller. Show turf areas and drip-irrigation lines/beds on landscaping plan. Irrigation systems shall be controlled with automatic timer and rain sensors. Any turf area shall use species that utilizes at least 25% less water than Kentucky Bluegrass. The Town Building Official may determine whether this standard is applied on a lot by lot basis or whether the common area on a project may be considered in satisfying this standard. The intent is that an entire planned development meets the requirement.
- Xeriscaped: Landscaping plan must only show xeriscape plants listed by [Colorado Waterwise](#), or source recognized by the Town Building Official. Landscape plan must meet landscaping minimum standards. Temporary irrigation is permissible during plant establishment period. Landscaping must be planted prior to CO to be eligible.

Points: limited turf: 2 pts., xeriscaped: 4 pts.

Confirmation: will be at plan review and final inspection.

(c) Part 1.03 Storm Water Irrigation

Benefit: Recycling stormwater from building for landscape irrigation reduces water usage, and restores ground water. 1" of water on 1,000sq/ft of roof = 265 gal. of freshwater.

Qualification: Provide a grading plan which illustrates the principle and construct swales to maximize distribution of surface drainage to planted areas on site, or direct surface drainage to a larger, neighborhood ecosystem. Subsurface “deep-root” irrigation for individual plantings also qualifies.

Points: 4

Confirmation will be at plan review and final inspection.

(d) Part 1.04 Food Production: On Site Greenhouse

Benefit: Solar Greenhouses can provide fresh local produce year round as well as heat, if directly connected to the home, on sunny winter days.

Qualification: Greenhouse must be built for food production and must be isolatable from living space and must be greater than 30 square feet. Any supplemental heating for the greenhouse must be provided by a separately controllable system or zone with a maximum temperature set point of 50 degrees F.

Points: 4

Confirmation will be at plan review and final inspection.

(e) Part 1.05 Ultra-low or Dual-flush Toilets

Benefit: Toilets typically use the most water of any household fixture or appliance, on a daily basis. New and improved high-efficiency models use less water per flush.

Qualification: All toilets must be ultra-low or dual flush per current EPA WaterSense requirements.

Points: 2 per fixture (6 maximum)

Confirmation will be at plan review and final inspection.

(f) Part 1.06 Low-flow Showerheads

Benefit: According to the EPA, showering represents approximately 17 percent of residential indoor water use in the United States. Low-flow showerheads reduce water consumption, and the energy used to heat shower water.

Qualification: Shower Heads that meet or exceed the current EPA WaterSense requirements must be installed. Provide any documentation for on-site inspection. Only 1 shower head in each shower to obtain points.

Points: 1 per fixture (3 maximum)

Confirmation will be at plan review and final inspection.

(g) Part 1.07 Low-flow Bathroom Faucets

Benefit: Faucets account for more than 15 percent of indoor household water use. Low-flow bathroom sink faucets and accessories can reduce a sink's water flow by 30 percent or more without sacrificing performance.

Qualification: Bathroom sink faucets must be WaterSense listed and labeled. Listings of approved products are available at www.epa.gov/watersense.

Points: 1 per fixture (3 maximum)

Confirmation will be at plan review and final inspection.

(h) Part 1.08 Energy Star Clothes Washer and/or Dishwasher

Benefit: Traditional washing machines average about 41 gallons of water per load, but new, energy- and water-conserving models (front-loading or top-loading, non-agitator ones) use only 16 to 20 gallons per load. Efficient dishwashers use about 1/3 less water, and 41% less energy to heat water and dry.

Qualification Clothes washer/dishwasher must be listed on www.aceee.org or www.energystar.gov, or must be shown to have similar water usage.

Points: 1 per appliance

Confirmation will be at plan review and final inspection.

(2) Part 2: Recycling and Reuse

(a) Part 2.01 Recycle - wood, concrete, metal scrap and cardboard

Benefit: Reduced impact on landfill from construction materials.

Qualification: Must be shown on construction management plan. Labeled containers for concrete, metal, and/or cardboard construction waste located on site with evidence of use and service.

Points: 1 per material type, 3 max.

Confirmation will be ongoing through all inspections.

(b) Part 2.02 Beetle-kill Lumber for structural or nonstructural applications (2 pts. per application, 6 max)

Benefit: Pine beetle affected lumber harvested in Colorado can be utilized as dimensional framing material, as well as siding, flooring, trim, etc.

Qualification: Material must be used for over 50% of each application.

Points: 2 per application, 6 maximum

Confirmation will be at framing and final inspection.

(c) Part 2.03 Donate Surplus Materials

Benefit: Extra onsite materials, either new or deconstructed, can be donated. Options include the Habitat for Humanity ReStore in Glenwood Springs and the Pitkin County Landfill.

Qualification: Keep records & receipts of donated materials on job site.

Points: 1 per trailer load, 3 max

Confirmation will be at final inspection.

(d) Part 2.04 Reclaimed and/or recycled-content materials

Benefit: Supports recycling market and reduces use of virgin materials.

Qualification: Use of construction materials that are either reclaimed from another structure, and/or any non-structural materials with recycled-content in them 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 all qualify as reclaimed materials (must provide documentation). Some common recycled-content materials include composite decking, recycled-content faux shake/slate roofing, cellulose or shredded cotton batt insulation, recycled-content carpets, countertops, recycled-content tile, etc. Provide material info onsite; field inspected. More than 50% of the material type in place must be reclaimed, recycled and/or recycled-content; recycled content minimum for material shall be 50% post or pre-consumer.

Points: 2 per material type; 4 maximum

Confirmation: Material information/documentation must be on job site with field set of plans for inspection.

(e) Part 2.05 Built-in Recycling and/or Compost Center

Benefit: A conveniently located recycling and compost center in the home will encourage the process.

Qualification: Design and build a recycling and/or compost center, in or adjacent to kitchen, with at least two bins for glass, cans, plastic, paper, compost and other common recycling items.

Points: 2

Confirmation will be at plan review and final inspection.

(3) Part 3: Framing and Materials

(a) Part 3.01 Insulated Concrete Forms (ICFs) for foundation

Benefit: Insulated Concrete Forms (ICFs) are expanded-polystyrene foam blocks which are stacked with concrete poured into the internal void. ICFs provide improved insulation and reduced moisture transport over conventional foundation walls.

Qualification: ICFs shown on structural drawings, must be used for more than 75% of the foundation.

Points: 5

Confirmation will be at plan review and foundation inspection.

(b) Part 3.02 Insulated Concrete Forms (ICFs) for above-grade walls

Benefit: Insulated Concrete Form walls act as a thermal barrier, making it possible for homes to retain heat more effectively. The two layers of foam plus concrete in ICF walls give the building an R40-50 insulation value; this can greatly reduce heating costs.

Qualification: ICFs shown on structural drawings; must be used for over 75% of exterior walls.

Points: 8

Confirmation will be at plan review and framing inspection.

(c) Part 3.03 Double Wall Framing

Benefit: Continuous air barrier & increased insulation levels.

Qualification: Show wall elevations on plans. Double wall framing must be incorporated in 75% or more of the building.

Points: 6

Confirmation will be at plan review & framing inspection.

(d) Part 3.04 Incorporate Optimal Value Engineering (OVE) Framing Techniques

Benefit: Conserve building materials & increases insulation potential.

Qualification:

- Subpart 3.04.1 - Use 24-inch on center studs for over 75% of the structure.
- Subpart 3.04.2 - Use 2-stud or california type corners for over 75% of the structure.
- Subpart 3.04.3 - Use efficient headers for over 75% of the structure. "Efficient headers" refers to insulated headers on exterior walls or eliminate headers in non-load bearing walls.

Points:

- Subpart 3.04.1: 3 points
- Subpart 3.04.2: 3 points
- Subpart 3.04.3: 3 points

Confirmation will be at plan review and framing inspection.

(e) Part 3.05 Structural Elements

Benefit: Conserves building materials. Smaller, fast-growing, tree species are used in engineered lumber, and there is little or no waste involved in the production and end use of the products. Engineered lumber products are an innovative alternative to the solid sawn lumber materials that have to be harvested in diminishing old growth forests.

Qualification:

- Subpart 3.05.1: Engineered wood joists used for > 50% of flooring system.
- Subpart 3.05.2: Engineered wood rafters or pre-fab trusses > 50% roof framing.
- Subpart 3.5.3: Engineered wood studs for > 50% of the structure.

Points:

- Subpart 3.05.1: 1 point
- Subpart 3.05.2: 1 point
- Subpart 3.05.3: 3 points

Confirmation will be at plan review and framing inspection.

(f) Part 3.6 Pre-cut, prefabricated elements

Benefit: Pre-cut or off-site construction of structures reduces material waste.

Qualification:

- Subpart 3.06.1: Pre-cut studs and trusses > 75% of structure.
- Subpart 3.06.2: Panelized / Prefabricated Walls / Modular Sections

Points:

- Subpart 3.06.1: 2 points
- Subpart 3.06.2: 4 points

Confirmation will be at plan review and framing inspection.

(g) Part 3.07 Forest Stewardship Council (FSC) Certified Materials for Framing (used in < 50% of the building)

Benefit: Preserve old-growth forests by promoting sustainably-harvested wood products.

Qualification: Wood certified by either the Forest Stewardship Council (FSC) Material must be used in over 50% of building.

Points: 3

Confirmation will be at plan review and framing inspection.

(h) Part 3.08 Structural Insulated Panels (SIPs) or Straw Bales used for exterior walls

Benefit: SIPs (a foam core laminated to oriented strand board) and straw bale construction provide superior R-values and reduced air-infiltration to conventional 2x6" wall construction.

Qualification: Must be used for > 75% of exterior walls.

Points: 10

Confirmation will be at plan review and framing inspection.

(i) Part 3.09 Materials Manufactured in Colorado

Benefit: Limit transportation and reduce the environmental effects.

Qualification: Provide documentation on-site for any materials used that are manufactured in state. Concrete does not qualify.

Points: 2 per material used, 6 max

Confirmation will be at final inspection.

(j) Part 3.10 Sustainable Forestry Initiative (SFI) or Forest Stewardship Council (FSC) Certified Materials Products

Benefit: Preserve old-growth forests by promoting sustainably-harvested wood products.

Qualification: Wood products certified by either the Forest Stewardship Council (FSC) or Sustainable Forestry Initiative (SFI). -In order to qualify, 100% of each of the building materials used must be certified.

Points: 2 per material type, 12 max

Confirmation will be at the final inspection.

(k) Part 3.11 Roofing Materials: Lifespan greater than 30 years or > 75% Recycled Content

Benefit: Waste reduction

Qualification: Install roofing with minimum 30 year life or roofing with greater than 75% recycle content. Roofs that typically will qualify for 75% recycled content include metal and faux shake/slate roofing. Provide cut sheet for roofing with 30 year warranty or recycled content.

Points: 2

Confirmation will be at plan review and final inspection.

(4) Part 4: Energy

(a) Part 4.01 Continuous Air Barrier

Benefit: Building tightness against air infiltration is an important aspect of energy conservation. The barrier prevents warm, conditioned air from leaking out around doors, windows & other cracks in the winters & in the summer, a proper seal will stop hot air from entering the residence.

Qualification: Air barrier must be continuous & must be shown on construction drawings.

Points: **REQUIRED**

Confirmation will be at plan review and insulation.

(b) Part 4.02 Roof/Ceiling Insulation

Benefit: Increased insulation levels reduce heat loss. This is the most effective use of insulation to reduce overall heat loss.

Qualification: Show roof/ceiling insulation plan and install per plan. Post completed Insulation Certificate in mechanical room.

Points: 1 to 15 - One point for each R value over current IECC Code minimum, up to 15 points maximum.

Confirmation will be at insulation inspection.

(c) Part 4.03 Reflective Radiant Barrier

Benefit: A reflective radiant barrier installed in a vented attic space reduces ceiling heat gains and cooling loads in summer.

Qualification: Show and specify a reflective radiant barrier on roof/ceiling insulation plan. Install a reflective radiant barrier on the "ceiling" or "floor" of the attic, or under the roof sheathing of a vaulted ceiling.

Points: 2

Confirmation will be at framing if installed on or under roof sheathing; or insulation inspection if laid over insulation.

(d) Part 4.04 Wall Insulation

Benefit: Increased insulation levels reduce heat loss.

Qualification: Show wall insulation in construction plans. Install per plan. Post completed Insulation Certificate in mechanical room.

Points: 1 to 15 - One point given for each R value over current IECC Code minimum, up to 15 points maximum.

Confirmation will be at insulation inspection.

(e) Part 4.05 Continuous Exterior Insulation

Benefit: Continuous exterior insulation reduces heat loss, increased the R-value of the wall system, reduces chance of moisture damage and reduces air infiltration, therefore reducing the size of the HVAC system.

Qualification: Exterior insulation must be detailed on the plans.

Points: 1 to 10 - One point given for each R value over current IECC Code minimum, up to 10 points maximum.

Confirmation will be at insulation inspection.

(f) Part 4.06 Slab Insulation

Benefit: Increased insulation levels reduce heat loss.

Qualification:

- Under-Slab: Must show horizontal under-slab insulation in addition to required slab-edge insulation on drawings and install accordingly.
- Slab-Edge (Perimeter): Must show slab-edge (perimeter) insulation greater than minimum IECC requirement on drawings and install accordingly. Methods shown in figure R402.2.8 below.

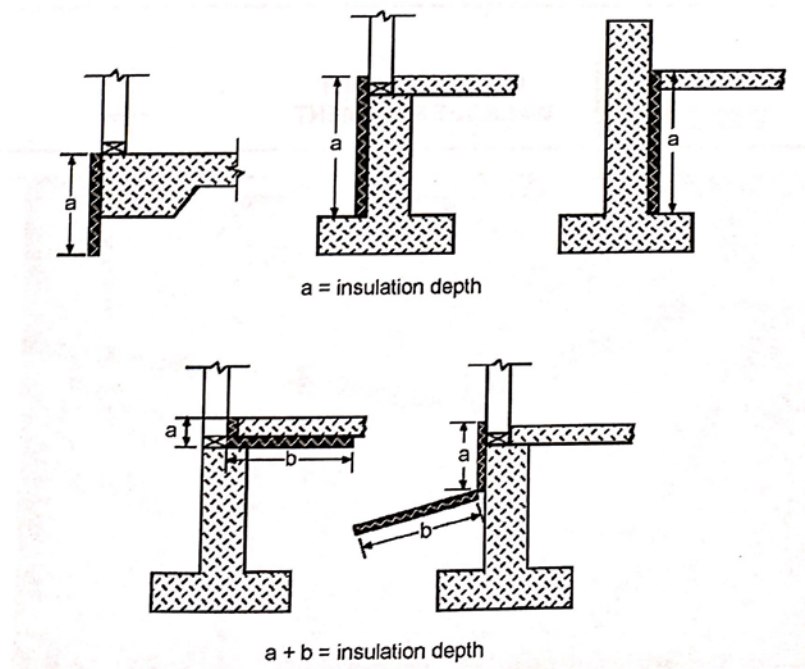


Figure R402.2.8
SLAB INSULATION METHODS

Points: 4 pts. max

- Under-Slab: R5, 2 pts.; R10, 3 pts.
- Slab-Edge (Perimeter): R5 over current IECC minimum, 1 pt.

Confirmation will be prior to slab pour.

(g) Part 4.07 Crawl Space/Basement Wall Insulation

Benefit: Increased insulation levels reduce heat loss.

Qualification: For crawl space and/or basement walls, show insulation of wall in construction plans. Install per plan. Insulation must be continuous for entire wall area below main floor.

Points: 1 pt for Total R-values, in increments of 5, over current IECC Code minimum, up to 2 pts.

Confirmation will be at insulation or final inspection.

(h) Part 4.08 Blown or Sprayed Insulation

Benefit: Blown or sprayed insulation reduces air infiltration and offers higher effective R values than batt insulation.

Qualification: Specify blown fiberglass or cellulose, or spray-foam insulation on plans. Blown insulation installed in attics/ceilings, walls, and basements/crawl spaces.

Points: 1 per Quantity Level - One point given for each quantity level of blown or sprayed insulation installed. For example, if 80% of the insulation in a structure is blown in, then quantity level 4 (76-100%) or 4 points would be given.

Confirmation will be at insulation inspection.

(i) Part 4.09 High Performance Windows

Benefit: High-performance windows significantly increase a wall's thermal resistance, helping keep the interior warmer in the winter and cooler in the summer.

Qualification: Provide window manufacturer specifications with window schedule as part of construction plans. Leave window labels in place until inspected.

Points: 2 points for each U-.02 below current IECC Code minimum, 10 maximum.

Confirmation will be at insulation inspection.

(j) Part 4.10 Insulate all hot water pipes at all locations

Benefit: Insulating hot-water pipes reduces heat loss through the plumbing system. Hot water is delivered to point of use faster, reducing water waste.

Qualification: Closed cell foam or fiberglass pipe insulation with a minimum R-value above current IECC Code minimum must be installed on all hot water pipes.

Points: 1

Confirmation will be at the insulation inspection.

(k) Part 4.11 Radiant Floor / Hydronic Baseboard Heating System

Benefit: Buildings with hydronic heating systems have consistently shown lower heating energy use than equivalent structures with forced-air heating systems. Occupants are warmed at lower air temperatures with radiant heat. Hydronic systems can be zoned, which provides the potential for unoccupied rooms to be kept at lower temperatures, which lowers heat loss and reduces fuel consumption.

Qualification: Either in-floor radiant heat or baseboard hydronic heat qualifies provided over 50% of the heating needs of the structure are met by hydronic means.

Points: 8 points for 50%, 12 points for 75% and 16 points for 100% of heating needs.

Confirmation will be at mechanical rough-in and final inspection.

(l) Part 4.12 HERS Rated House

Benefit: The overall energy efficiency of Home Energy Rating System (HERS)-rated homes is usually higher than minimum building-code standards. E-Star is an accredited (HERS) provider, and the major trainer and certifier of Home Energy Raters in Colorado. An E-Star Energy Rating gives each home a score expressed on a scale from 0 to one 100, with 100 as the (2003 IECC) baseline. The goal is to be “better than code”, and ultimately “net zero”. Complete information, including local rating professionals is available at www.aspencore.org.

Qualification: Submit documentation with plans from an (HERS) professional including calculations showing an index of current IECC Code minimum or less and, at completion of the project, an As-Built Energy Rating Report with final rating. 5 points will be given for an index rating 5 below current IECC Code minimum, 20 pts. max.

Points: 5 to 20

Confirmation will be upon presentation of the qualifying As-Built Energy Rating Report and is required prior to Certificate of Occupancy.

(m) Part 4.13 Blower Door Test

Benefit: Promotes tighter construction and pinpoints areas of air infiltration.

Qualification: Complete a blower door test by a certified professional that accurately shows air changes per hour (ACH) @ 50 Pascals. Test results must show ACH of current IECC Code minimum; 1 point for each increment of 0.5 below IECC Code minimum, ACH50, up to 6 points.

Points: 1 to 6

Confirmation will be upon presentation of the qualifying test results. Should be done prior to insulation installation.

(n) Part 4.14 Insulating Window Coverings Installed

Benefit: 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.

Qualification: Window coverings must be installed on 75%, or more, of the windows and have a minimum R-3 to qualify. Some common options are duet/cellular shades, or quilted shades.

Points: 3

Confirmation will be at final inspection.

(o) Part 4.15 Efficient Boiler or Furnace

Benefit: Efficient operation reduces energy consumption and emissions.

Qualification: Specify and install a heating appliance with an AFUE rating of at a minimum of 8% above current IECC code minimum.

Points: 1 to 7 - If a boiler and/or furnace with a (combined) AFUE rating of 8% above current IECC code minimum is installed, then one point is given. For each point of efficiency above that, an additional point is given.

Confirmation will be at the final inspection.

(p) Part 4.16 Ductwork in conditioned spaces

Benefit: Whenever possible, running ductwork through unconditioned space, especially attics, should be avoided. It creates a potential for heat loss and moisture problems.

Qualification: Keep all ductwork within thermal envelope. Or, ducts in unconditioned space should be sealed with mastic at all joints and insulated to a minimum R-6; R-8 minimum in attics.

Points: 2, for all ductwork within conditioned space; or, 1 for properly sealed and insulated ductwork in unconditioned space

Confirmation will be at the insulation inspection.

(q) Part 4.17 No Mechanical Air Conditioning

Benefit: Eliminating the need for air conditioning offers an immediate initial cost savings as well as reduced operational costs for the life of the structure.

Qualification: Proper design of building aspect, window sizing and placement, overhang shading, and insulation, can eliminate the need for air conditioning systems in our climate. No components for a roughed-in system should be installed.

Points: 4

Confirmation will be at final inspection.

(r) Part 4.18 Programmable Thermostats

Benefit: Allows occupants to set heating and cooling needs to their lifestyle.

Qualification: Thermostats that automatically change programmed temperature settings must be installed and be functional.

Points: 1 point per each 50% of heated building space, 2 maximum.

Confirmation will be at final inspection.

(s) Part 4.19 Thermostats for each room

Benefit: A zoned system allows heating and cooling to be isolated to occupied rooms only.

Qualification: Each enclosed room must have a separate thermostat, not including storage areas, closets, bathrooms, mechanical rooms, or non-habitable space.

Points: 2

Confirmation will be at final inspection.

(t) Part 4.20 Tankless on-demand water heater(s) or efficient (above current IECC Code minimum) gas water heater

Benefit: Efficient operation reduces energy consumption and emissions.

Qualification: Gas or electric tankless models qualify, and must meet over 50% of total domestic hot water needs. A combined (space and water heating) appliance or a condensing water heater with a thermal efficiency rating above current IECC minimums qualify. Units must have an intermittent ignition device (IID) instead of a standing pilot light and a water filter to reduce mineral build up and system failure.

Points; 3

Confirmation will be at final inspection.

(u) Part 4.21 Energy Star Appliances

Benefit: Energy Star appliances are designed and tested for energy efficiency as well as water conservation.

Qualification: Any appliances, other than those credited for water conservation (Sec. 1.8), with the EPA's Energy Star logo on them and/or listed on www.energystar.gov website qualify. Clothes dryers are not Energy Star rated, however, an outdoor clothesline will qualify.

Points: 1 pt. per appliance, 4 max. An Energy Star washer and dishwasher may receive points from both Part 1.8 and this part.

Confirmation will be at final inspection, with appliances installed and operable.

(v) Part 4.22 Ceiling fans/air destratification system in common rooms

Benefit: Ceiling fans and air-handling systems help to reduce the accumulation and of warm air at ceiling level and exfiltration through the ceiling during the winter; and they circulate air in the summer, making a room feel cooler.

Qualification: Show units/systems in construction plans.

Points: 1 per fan, 4 max.

Confirmation will be at final inspection.

(w) Part 4.23 Exterior Lighting Minimized

Benefit: Reduces nighttime light pollution, glaring and offensive light sources, and conserves energy.

Qualification: Exterior lighting plan to be submitted with construction plans. Total exterior lighting must be less than 5500 lumens for points.

Points: 2

Confirmation will be at plan review and the final inspection.

(x) Part 4.24 Efficient Lighting

Benefit: Alternatives to incandescent bulbs use 20% or less wattage for equivalent Lumens.

Qualification: Minimum of 75% of lighting fixtures are **REQUIRED** to be high-efficacy (LED).

Points: 2 pts for > 75% LED bulbs, 4 pts for 100% LED.

Confirmation will be at final inspection.

(y) Part 4.25 Motion Detecting Light Switches

Benefit: Lighting operated by motion detection saves energy while increasing safety and security.

Qualification: Install motion-detection-controlled lighting as an integrated unit or by a remote motion sensor for closets, basements, etc.

Points: 1 to 4 - One point is given for each motion detection switch installed, up to 4 points

Confirmation will be at final inspection.

(5) Part 5: Renewable Energy

(a) Part 5.01 Passive Solar Design

Benefit: 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.

Qualification: Site must have reasonably unobstructed solar access. Deciduous trees are allowable to the south, and desirable to the east and west, for summer shading. Site plan must show a Sun Angles Dial along with the North Arrow, showing at minimum angles of sunrise, angles of the sun at noon, and angles of sunset; for summer solstice, equinox, and winter solstice respectively. In Basalt, the angles of the noon sun are 68, 47, and 25 degrees for summer solstice, equinox, and winter solstice, respectively.

Qualification (specific):

- Subpart 5.01.1 Optimize Glazing / Orientation: Install south-facing (within at least 20 degrees east of due south) glass equivalent to 7% or more of total heated floor area. Effective south-facing windows require a high Solar Heat Gain Coefficient (SHGC) – typically 0.60 or higher — to maximize heat gain.
- Subpart 5.1.2 Shading: Install south facing glass equivalent to 12% or less of total heated floor area, and provide proper shading according to the formula $E = H / 3.38$, or conversely, $H = E \times 3.38$, where E = eave depth, and H = height of bottom of window from the eave.
- Subpart 5.01.3 Thermal Mass: For each square foot of south-facing glass, provide at minimum an equivalent square footage of thermal mass interior walls and/or floor reached by the solar gain. Examples of thermal mass include concrete, gypcrete, tile, masonry or stone floors; double-layered sheetrock, masonry, stone, adobe walls.

Points:

- Subpart 5.01.1: 10 points
- Subpart 5.01.2: 10 points
- Subpart 5.1.3: 5 points

Confirmation will be at plan review and final inspection.

(b) Part 5.02 Solar hot water system for domestic hot water

Benefit: Supply or supplement hot water for domestic use with little or no energy consumption.

Qualification: 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 due south, and between 30 and 50 degrees from horizontal. System size is dependent on number of bedrooms. Evacuated-tube collectors are typically 25% more efficient than flat plate collectors. Parenthesized areas are minimum requirements for evacuated-tube collectors.

- 1 bedroom – 40 square feet of collectors (30 square feet), 50 gallons storage
- 2 bedrooms – 48 square feet of collectors (36 square feet), 60 gallons storage
- 3 bedrooms – 64 square feet of collectors (48 square feet), 80 gallons storage
- 4+ bedrooms – 96 square feet of collectors (72 square feet), 120 gallons storage

Points: 8

Confirmation will be at plan review and final inspection.

(c) Part 5.03 Integrated solar hot water system that supplements both radiant floor heat and domestic hot water

Benefit: Supply or supplement hot water for domestic use and space heating with little or no energy consumption.

Qualification: Install a solar hot water system sized as previous (bedroom based) that provides heat for radiant floor heating as well as domestic hot water. Show system in construction plans and schematics.

Points: 16

Confirmation will be at plan review and final inspection.

(d) Part 5.04 Solar hot-water system rough-in only

Benefit: Simplifies solar retrofit if undertaken in the future.

Qualification: Two, well-secured runs of copper plumbing pipe, 3/4" minimum, insulated to an R-6, minimum, must be installed in an interior wall between the attic/roof and the mechanical room or area that could house the storage tank/heat exchanger. An 18/2 (thermostat) wire (or 1/2" conduit) must also be run at the same location for future control installations. The plumbing and wiring 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 and wiring shall end after penetrating the roof that will support the collectors. Ends of installed pipes and wires must be labeled "solar"; pipes and conduit must be capped or effectively sealed; wires terminating outside must be in a sealed junction box. Provide 3'x3' of floor space for a future storage tank.

Points: 2

Confirmation will be at plan review and final inspection.

(e) Part 5.05 Solar photovoltaic system

Benefit: Photovoltaic (PV devices) change sunlight directly into household electricity.

Qualification: Applicant must submit plans from a qualified architect, engineer, or designer certifying the kW capacity, and proper system design. Photovoltaic panels should be mounted within 20 degrees of due south and between 30 and 50 degrees from horizontal. System must have reasonably unobstructed solar access. Proper protection to prevent electric islanding must be in place in the event on a power outage.

Points: 10 for every 1 kW installed to a maximum of 50

Confirmation will be at plan review and final inspection.

(f) Part 5.06 Solar photovoltaic system rough-in only

Benefit: Simplifies solar retrofit if undertaken in the future.

Qualification: A 1" conduit must be installed between the attic/roof and the future inverter location, in the general vicinity of the electrical panel. Ends of the conduit shall be labeled "solar". Conduit terminating in an attic space under the roof that will support the solar collectors shall be above the insulation for easy sighting. If there isn't an attic space, the piping and wiring shall end on the roof that will support the collectors, in a sealed junction box. Provide 3'x3' of wall space 30" deep for a future inverter. Reserve two slots in the main breaker panel for a 240v breaker.

Points: 2

Confirmations: will be at plan review and final inspection.

(g) Part 5.07 Ground source heat pump (geothermal) system

Benefit: Ground source heat pumps utilize glycol loop systems drilled into the ground to heat or cool a structure.

Qualification: Five points are given for each quantity level of the structure's heating/cooling needs met by the system. If utilized for a snowmelt system, total energy calculations must include exterior energy use(s) as well.

Points: 10 to 40 - 10 points per quantity level. For example, if the system met 60% of the structure's heating/cooling needs, quantity level 3 (51-75%), 10 points per quantity level, 30 points would be given.

Confirmation will be at plan review and final inspection.

(h) Part 5.08 High-efficiency Stove

Benefit: Wood and biomass-fuel burning technology has improved tremendously in recent years. Wood stove efficiency has increased and emissions rates have been reduced with pellet, soapstone, catalytic and non-catalytic stoves. Induction range stoves also qualify.

Qualification: Specify stove make and model number on plans. Stove may generate no more than 2.0 grams/hour of particulate and must exceed 75% efficiency as determined by EPA (New Source Performance Standard for New Residential Wood Heaters) test methods using Low-Heat Value protocol. Provide EPA "Temporary Label", manufacturer's (IRS) certification statement, or other

documentation at plan review. Installation must conform to manufacturer's recommendations at final inspection.

Points: 4

Confirmation will be at plan review and final inspection.

(i) Part 5.09 5-year commitment of Renewable Energy

Benefit: Renewable energy is local, clean and sustainable. Owners can invest in renewable energy from their utility provider.

Qualification: Submit copy of applicable electric bill from utility showing level of renewable energy commitment (if available), as well as signed document from the applicant stating a minimum 5-year commitment at given levels.

Points: 2 per Quantity Level - For example, if your wind energy commitment represented 100% of your average monthly use, then Quantity Level 4 (76%-100%) would apply, 2 points per quantity level, giving the applicant 8 points.

Confirmation will be at plan review and final inspection.

(6) Part 6: Indoor Air Quality

(a) Part 6.01 Formaldehyde-free and/or low-toxic insulation

Benefit: Formaldehyde resins have been used in the manufacture of fiberglass batts. Off-gassing of formaldehyde, a probable human carcinogen, has been found to contaminate indoor air. Use of alternative insulating products reduces exposure to occupants.

Qualification: Insulation must be labeled as formaldehyde-free or Greenguard certified at www.greenguard.org.

Points: **REQUIRED**

Confirmation will be at plan review and insulation inspection.

(b) Part 6.02 Low- or zero-VOC and/or low-toxic interior paint, stain/finishes, and adhesives

Benefit: Interior paints, stains & adhesives contributes to total VOC levels. High levels of VOC has negative effects on human health.

Qualification: Products must be either labeled "Low or no VOC", Greenguard certified www.greenguard.org, or show that VOC levels are below EPA thresholds.

Points: **REQUIRED**

Confirmation will be at final inspection.

(c) Part 6.03 Mold Prevention: Moisture Management Strategy

Benefit: Most building durability attributes can be affected by moisture. Uncontrolled moisture may reduce the structural soundness of buildings through dry rot in wood, corrosion in steel, freeze-thaw cycles, spalling and efflorescence in masonry, among other damage mechanisms. Moisture also can affect the health of occupants, typically through the potential for breeding harmful organisms. In other words, uncontrolled moisture will adversely affect the most vital attributes of buildings.

Qualification: Submit drawings detailing the thermal envelope and showing how the walls and roof will be able to dry. For remodels, source of mold must be identified and mitigated. In crawlspaces, install 6 mil clear plastic as a vapor barrier over the dirt surface and overlap floor seams 12", and glue to foundation wall. This treatment reduces ground gases from entering the home and reduces winter evaporative cooling, and the furnace load substantially.

Points: **REQUIRED**

Confirmation will be at plan review and the insulation inspection.

(d) Part 6.4 Vapor Retarder or Wall System Allowing Over 50% RH

Benefit: Eliminating moisture from wall cavities prevents mold and decay fungi from developing. This product allows closed building envelope systems to increase their drying potential with seasonal climatic changes.

Qualification: Install a vapor-retarder system in exterior walls that allows for moisture permeability above 50% relative humidity. Specify on wall Parts. ZIP sheathing systems also qualify.

Points: 5

Confirmation will be at plan review and insulation inspection.

(e) Part 6.05 Exhaust Range Hood Outside

Benefit: Removes moisture generated from cooking, as well as cooking odors and products of combustion from gas appliances.

Qualification: Install a range hood to exhaust not more than 200 CFM to the outside. Larger hoods are required to provide make-up air to prevent depressurization. Hoods larger than 600 CFM are not permitted in a residence.

Points: 2

Confirmation will be at plan review and final inspection.

(f) Part 6.06 Low-or non-toxic floor coverings

Benefit: Carpet and other traditional floor coverings contribute VOCs to indoor air.

Qualification: Materials either listed on www.greenguard.org or show that coverings are below EPA thresholds for low/non-toxicity.

Points: 1 per Quantity Level - Quantity Level is determined by the percentage of total floor area meeting the above criteria. For example, if 80% of the total flooring was nontoxic, then quantity level 4 (76-100%) would apply, 1 point per Quantity Level, so 4 points would be given.

Confirmation will be at plan review and final inspection.

(g) Part 6.07 All furnaces, fireplaces, boilers, gas water-heaters, sealed combustion/direct vented.

Benefit Sealed combustion/directed-vented gas appliances reduce the risk of combustion by-products entering the indoor environment and supply combustion air from outside directly to the combustion chamber.

Qualification: Submit appliance specifications with construction plans.

Points: 4

Confirmation will be at final inspection.

(h) Part 6.08 High-efficiency filter on HVAC system (HEPA, UV, etc,)

Benefit: High-efficiency filters remove contaminants down to 0.3 microns in size from circulating air.

Qualification: Install a high efficiency filter on a forced-air distribution system. Installed filter must be rated at 99% efficiency or higher.

Points: Hepa: 4 pts; UV: 5 pts.

Confirmation will be at final inspection

(i) Part 6.09: Radon Mitigation

Benefit: Radon is a natural radioactive gas that you can't see, smell or taste. The EPA has determined it is a carcinogen.

Qualification: Design and install radon mitigation system that removes radon or other soil gas from under the slab/crawl space and vent per EPA guidelines. More information is available at <http://www.epa.gov/radon/index> and www.buildingscience.com.

Points: 3

Confirmation: will be at final inspection.

(7) Part 7: Innovation Points

Innovative product use and/or design points will be given points on a case by case basis. The item must specifically meet the intent of the sustainable building regulations guidelines as stated at the beginning of this guidelines document, and points will be scaled as the item would apply to similar comparable items in the guidelines, as determined by the plans examiner.

Some options eligible for Innovation Points may include but are not limited to: Energy 10 Analysis, American Lung Association-certified home, modulating or sequentially staged boilers, "Passive House", frost-protected shallow foundation, trombe wall/interior thermal massing systems, evapotranspiration watering system, on site co-generation power system, passive solar lighting, etc.

(e) Type I Sustainable Building Regulations - Exterior Energy Use

(1) Mitigation required. Sustainable Building Practices discourage exterior energy uses. Any energy use by snow and ice melt systems, patio heaters and similar outdoor features or equipment must be offset. Approval for snowmelt and outdoor spas/hot tubs subject to Type 1 SBR requirements can be gained by offsetting the impacts through one of the following three methods:

- 100% on-site mitigation with renewable energy equivalent to the energy used as calculated below.
- Payment of a REMP fee for twice the base fee based on the energy used, Section 18-14 and the Town's adopted fee schedule.
- Provide off-site mitigation at twice the calculated energy use of the on-site energy users.

(2) Snowmelt energy use for dwelling units is 34,425 BTU/s.f./year at 100% efficiency. Outdoor hot-tubs/spas energy use is 430,000 BTUs per square foot per year.

(3) To determine required mitigation, calculate the energy consumption from depletable sources used. Energy use must be adjusted for actual appliance efficiency.

For example:

For 1000 s.f. of snowmelt from a 90% efficient boiler: $(34,425/.90)1000 = 38,250,000$ BTU/s.f./year must be mitigated. In kWh, that is $38,250,000/3412$, or 11,210 kWh per year of photovoltaic (PV) mitigation.