



## Alterations

### Requirements Application Packet

### For Alterations of One-and Two-Family Dwellings and Townhouses

**REFERENCES:**

- [2018 International Residential Code \(IRC\)](#)
- [Boulder Revised Code, 1981 \(B.R.C.\) - Title 10 Structures Boulder Revised Code, 1981 - Title 9 Land Use Code](#)
- [2018 International Wildland-Urban Interface Code \(IWUIC\)](#)
- [2020 City of Boulder Energy Conservation Code \(COBECC\)](#)
- [2020 National Electrical Code](#)
- [City of Boulder Design and Construction Standards](#)

**SCOPE:**

Use this checklist if there is no exterior scope or if the exterior scope is limited to the replacement of existing doors and windows or the installation of new doors and windows and replacement of siding only. This checklist outlines the minimum documentation necessary to allow a permit application for an interior alteration/remodel of a single family dwelling or townhome to be accepted for review. Applicants may be required to submit additional information as necessary to clearly demonstrate compliance with all applicable Codes. Please be advised that incomplete applications or plans that do not meet the submittal requirements will not be accepted for review.

For more information on any of the application requirements, refer to the [Residential Building Detailed Requirements Attachment](#). For information on how to prepare an application for submittal, refer to the [Online Permit Application Guide](#).

**REQUIRED APPLICATIONS, FORMS AND SUPPLEMENTAL INFORMATION:**

- [Building Permit Application for One and Two-Family Buildings, Residential Accessory Buildings and Townhomes](#) - (required for all applications)
- [Plumbing Fixture & Irrigation Count Form](#) - (required if the scope includes the replacement, removal, relocation, or addition of plumbing fixtures. Included as page 3 of this packet.)
- Asbestos Inspection Report - (required if disturbing potentially asbestos-containing, at the following trigger levels: 32 SF of surfaces; 50 linear feet of pipes; or creating waste equal in volume to a 55-gallon drum.)
- Demonstration of compliance with the [2020 City of Boulder Energy Conservation Code \(COBECC\)](#) - (required for all interior alterations; refer to page 2 and pages 4-9 of this packet.)

**ADDITIONAL MATERIALS THAT MAY BE REQUIRED:**

The following permits, approvals and supplemental information **may be required** based on the scope of the project and/or the location and development constraints of the property:

- [Floodplain Development Permit](#)
- [Historic Preservation Demolition Review approval](#) or [Landmark Alteration Certificate](#)
  - For exterior scopes if the exterior scope meets the B.R.C. [definition of demolition](#) and/or if there is any exterior scope for an individual landmark or a property located in a historic district.

- [Residential Housing and Development Excise Tax Form](#)
  - Required if there is a conversion of previously unconditioned space (such as a garage) into living space.
- Landscape and Street Tree Plan
  - Required if the cumulative project valuation for building permits from July 2003 to the present equals or exceeds 100% of the actual structure value per the [Boulder County Assessor](#).
- Site Plan
  - Required if there is an exterior scope such as new window or door openings or if garage is being converted into living space or other scopes of work that impact required parking.
- [Wildland-Urban Interface Code](#) compliance information
  - For any exterior scope for a property located in the Wildland Urban Interface, include in construction plan set.
- Copies of Prior Approvals - (Notice of Disposition and any City-stamped approved plans integrated into the plan set)

**CONSTRUCTION PLAN SET (minimum requirements for submittal):**

Plans shall be drawn to scale with a graphic scale bar on every page. A 3" x 3" square shall be provided in the lower right corner of the first sheet for the City's approval stamp. All sheets shall be the same size (oriented so that north is up) throughout the entire plan set, and of adequate size to clearly convey all information.

- Floor Plans
- Building Cross Sections at relevant locations
  - Required if the scope includes alterations to or the construction of new interior stairwells or elevators
- Wall Section Details (required if the scope includes exposing any exterior wall cavity)
- Structural Drawings (required for all structural modifications)
- Existing Building Code Analysis - include on cover page a description of scope (repair, alteration, change of occupancy/use, or relocation) and provide Level of Alteration (1, 2, 3, or 4, see page 4 of this packet).
  - Residential Mandatory Measures Checklist (required for ALL interior alterations, pages 5-7)
  - Residential Prescriptive Measures Checklist (required for Level 1 and Level 2 alterations, pages 7-9)
  - ERI documentation (required for Level 3 and 4 alterations)
  - Deconstruction Plan (required for Level 4 alterations)

► I certify that I have reviewed this checklist and have incorporated the applicable requirements into my construction plans for this submittal. I certify that all plans are clear and legible. I understand that incomplete applications or plans that do not meet the submittal requirements will not be accepted for review.

Applicant's Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Please note: The City of Boulder will periodically adopt and amend updated versions of all Model Codes and the B.R.C. through public process. When this occurs, some of the items in this checklist may be changed or updated, and a new checklist should be obtained from the [Planning and Development Services Applications and Forms Database](#). This checklist applies only to the requirements of the 2018 IRC as amended, [Section 10-5.5 of the B.R.C.](#), as it applies to structures covered by the scope, relevant portions of the [2020 City of Boulder Energy Conservation Code](#) and [Title 9](#) of the B.R.C., and is not a complete or exhaustive list of the requirements of any adopted Code, or of all elements which should be included in a plan set, nor does it contain complete information describing what your permit application must contain to comply with the IRC or the B.R.C.

Please contact the [Planning and Development Services Center](#) for more information.



City of Boulder Planning and Development Services Center  
**PLUMBING FIXTURE COUNT & IRRIGATION FORM**

BLD- \_\_\_\_\_

Property Address \_\_\_\_\_

**\*This form is required if removing, replacing, adding, or relocating plumbing fixtures.**

Residential    Non-Residential    Mixed-Use (Use upper and lower part of table for Non-Residential.)

25% AWC    50% AWC    85% AWC (New Non-Residential or Mixed-Use construction shall select an annual water budget. Reference the Schedule of Fees or the Plant Investment Fee Worksheet for details.)

**Irrigable Area** \_\_\_\_\_ s.f. (Only applies for new construction or when an irrigation meter is added to an existing development. There is a 2,000 square foot minimum unless this permit is part of a block in a larger project with a separate irrigation meter. The water budget for irrigation and the plant investment fee will be based upon this number.)

**Gallon Per Minute Demand of Largest Irrigated Zone** \_\_\_\_\_ g.p.m. (Only applies for a new separate irrigation meter.)

**\*\*\*\*\*ALL FIXTURES FOR THE ENTIRE BUILDING MUST BE INCLUDED\*\*\*\*\***

TYPE OF FIXTURE	EXISTING FIXTURES*	FIXTURES TO BE REMOVED*	NEW FIXTURES*	(FOR STAFF USE ONLY)
<b>RESIDENTIAL OR NON-RESIDENTIAL</b>				
Tank Toilet				
Bathtub / Bathtub Shower Combo				
Shower Stall (per head)				
Sink (Bath, Hand, Bar, Lab)				
Sink (Kitchen/Compartment)				
Dishwasher				
Ice Machine, _____ " line size				
Washer / Laundry Tub / Utility Sink				
Hose Bibb / Sill Cock / Outdoor Faucet				
Floor Drain / Floor Sink				
Sand Trap (Interceptor)				
OTHER: (Fixtures that may use city water or discharge into city sewer. Please list below:)				
<b>NON-RESIDENTIAL (ONLY)</b>				
Flush Valve Toilet				
Urinal				
Industrial Dishwasher				
Beverage Hook-up				
Drinking Fountain				
Sink (Service / Mop / Janitor)				
Emergency Eye Wash				
Emergency Shower				
Dip Well				
Grease Trap (Interceptor)				
OTHER: (Fixtures that may use city water or discharge into city sewer. Please list below:)				

\*Includes Rough-Ins

I, the undersigned, take full responsibility for the accuracy and completeness of the above information.

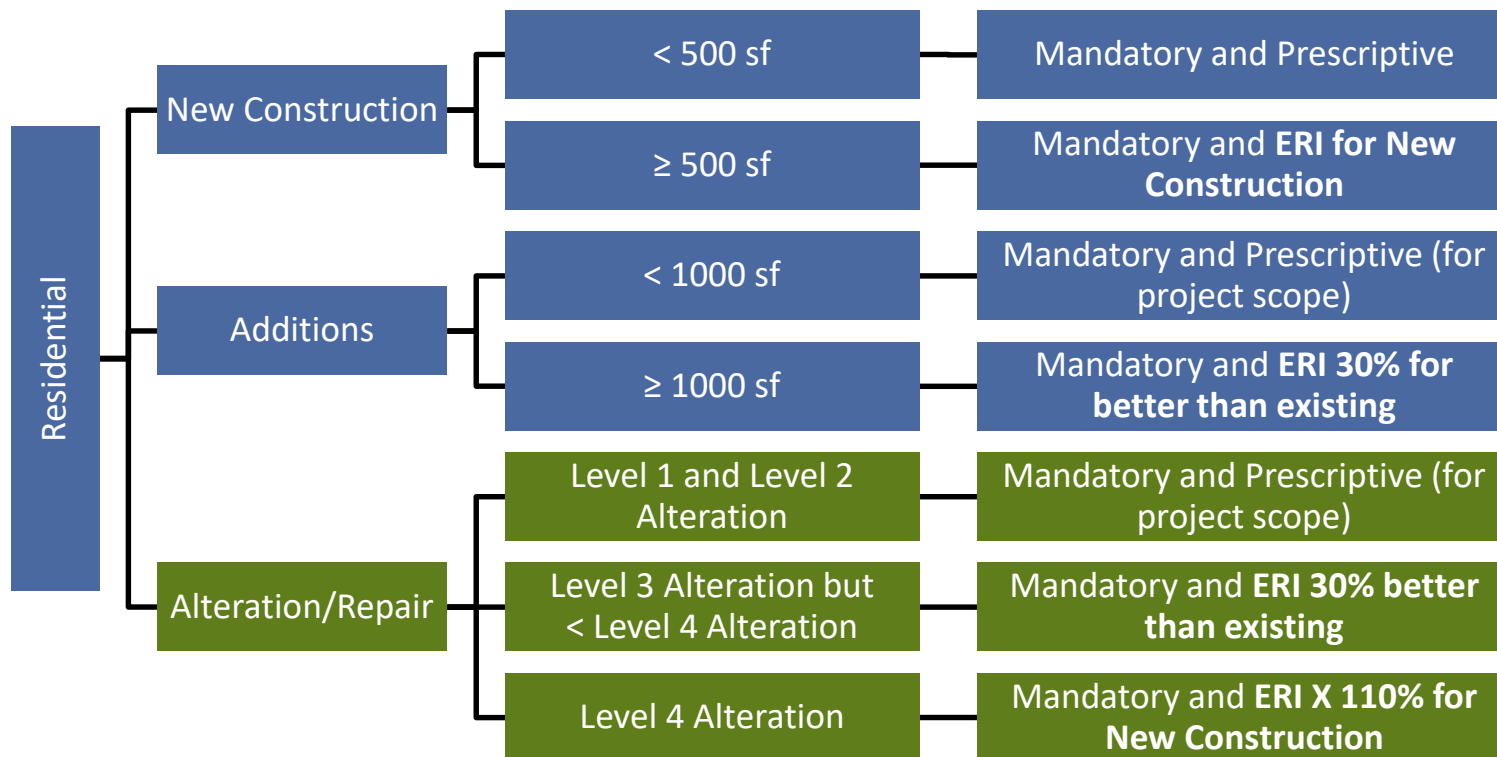
Applicant/Contractor \_\_\_\_\_

Date \_\_\_\_\_

City Approval \_\_\_\_\_

Date \_\_\_\_\_

# 2020 City of Boulder Residential Energy Code Pathways



## ALTERATION LEVELS

Level 1 Alteration	Alteration with scope that includes the removal and replacement or the covering of existing materials, elements, equipment, or fixtures using new material, elements, equipment or fixtures that serve the same purpose.
Level 2 Alteration	Alteration with scope that includes the reconfiguration of space, the addition or elimination of any door or window, the reconfiguration or extension of any system, or the installation of any additional equipment.
Level 3 Alteration	Alteration where the work area exceeds 50% of the building area.
Level 4 Alteration	An alteration where the work area exceeds 50% of the building area, mechanical and lighting systems are substantially replaced, and the alteration meets the criteria of substantial structural alteration, including fenestration replacement.

# 2020 Residential Energy Code Mandatory Measures Checklist for Alterations



**This Checklist MUST be completed for ALL ALTERATION projects.**

**Directions:** Based on the scope of the project, indicate the energy code compliance path in Section 1 below and the associated ERI required (for Level 3 & 4 Alterations). For the remainder of the checklist, indicate where in the permit plans each code section is met. For code provisions that don't apply indicate N/A. The complete 2020 Energy Code can be downloaded from [www.BoulderEnergyCode.com](http://www.BoulderEnergyCode.com).

**Project Address:**

**Date:**

1. Alteration Compliance Requirements							
Code Section	Focus Area	Code Description	Compliance Path	Project Details		Permit Reviewer Notes	
				Submitter Notes	Permit Reviewer Notes		
R503	Alterations		<input type="checkbox"/> Alteration Level 1: Mandatory and prescriptive requirements				
			<input type="checkbox"/> Alteration Level 2: Mandatory and prescriptive requirements				
			<input type="checkbox"/> Alteration Level 3: Project must demonstrate the home's ERI will be 30% less than existing				
			<input type="checkbox"/> Alteration Level 4: New Construction ERI Requirements X 110%				
			ERI Requirements	ONLY for Level 3 & 4 Alterations Note: Required ERI can be determined using the ERI calculator found at <a href="http://www.BoulderEnergyCode.com">www.BoulderEnergyCode.com</a>	Alteration SF		
					Existing home SF		
					Existing home ERI		
					Required ERI		
					Preliminary ERI		
Code Section	Focus Area	Code Description		Plan Drawing or Reference # to demonstrate compliance (N/A if not applicable)	Submitter Notes (e.g. If "N/A" Please explain why requirement does not apply or is not demonstrated on plans/specs)	Plans Examiner Notes (in office use)	
<b>ADMINISTRATIVE</b>							
R103.2	Information on construction documents	Construction documents shall include the following as applicable: 1. Insulation materials and their R-values. 2. Fenestration U-factors and solar heat gain coefficients (SHGC). 3. Area-weighted U-factor and solar heat gain coefficients (SHGC) calculations. 4. Mechanical system design criteria. 5. Mechanical and service water-heating systems and equipment types, sizes and efficiencies. 6. Equipment and system controls. 7. Duct sealing, duct and pipe insulation and location. 8. Air sealing details					
R103.2.1	Building thermal envelope depiction	The building thermal envelope shall be represented on the construction documents.					
<b>BUILDING ENVELOPE</b>							
R303.1.3	Fenestration and Doors	Procedures for determining fenestration and door performance are described in R303.1.3. Product Samples used for determining fenestration performance shall be production line units or representative of units purchased by the consumer or contractor.				Building Inspection: Verify NFRC of glass	
R402.4.1	Building thermal envelope	The building thermal envelope shall comply with Sections R402.4.1.1 and R402.4.1.2. The sealing methods between dissimilar materials shall allow for differential expansion and contraction.					

BUILDING ENVELOPE (continued)					
Code Section	Focus Area	Code Description	Plan Drawing or Reference # to demonstrate compliance	Submitter Notes (e.g. If "N/A" Please explain why requirement does not apply or is not demonstrated on plans/specs)	Plans Examiner Notes (in office use)
TABLE R402.4.1.1	General requirements	A continuous air barrier shall be installed in the building envelope. Exterior thermal envelope contains a continuous air barrier. Breaks or joints in the air barrier shall be sealed. Air-permeable insulation shall not be used as a sealing material.			
	Ceiling/attic	The air barrier in any dropped ceiling/soffit shall be aligned with the insulation and any gaps in the air barrier sealed. Access openings, drop down stair or knee wall doors to unconditioned attic spaces shall be sealed.			
	Walls	Corners and headers shall be insulated and the junction of the foundation and sill plate shall be sealed. The junction of the top plate and top of exterior walls shall be sealed. Exterior thermal envelope insulation for framed walls shall be installed in substantial contact and continuous alignment with the air barrier. Knee walls shall be sealed.			
	Windows, skylights and doors	The space between window/door jambs and framing and skylights and framing shall be sealed.			
	Rim joists	Rim joists shall be insulated and include the air barrier.			
	Floors (including above-garage and cantilevered floors)	Insulation shall be installed to maintain permanent contact with underside of subfloor decking. The air barrier shall be installed at any exposed edge of insulation.			
	Crawl space walls	Where provided in lieu of floor insulation, insulation shall be permanently attached to the crawlspace walls. Exposed earth in unvented crawl spaces shall be covered with a Class I vapor retarder with overlapping joints taped.			
	Shafts, penetrations	Duct shafts, utility penetrations, and flue shafts opening to exterior or unconditioned space shall be sealed.			
	Narrow cavities	Batts in narrow cavities shall be cut to fit, or narrow cavities shall be filled by insulation that on installation readily conforms to the available cavity space.			
	Garage separation	Air sealing shall be provided between the garage and conditioned spaces.			
	Recessed lighting	Recessed light fixtures installed in the building thermal envelope shall be air tight, IC rated, and sealed to the drywall.			
	Plumbing and wiring	Batt insulation shall be cut neatly to fit around wiring and plumbing in exterior walls, or insulation that on installation readily conforms to available space shall extend behind piping and wiring.			
	Shower/tub on exterior wall	Exterior walls adjacent to showers and tubs shall be insulated and the air barrier installed separating them from the showers and tubs.			
	Electrical/ phone box on exterior walls	The air barrier shall be installed behind electrical or communication boxes or air sealed boxes shall be installed.			
HVAC register boots	HVAC register boots that penetrate building thermal envelope shall be sealed to the subfloor or drywall.				
Concealed sprinklers	Where required to be sealed, concealed fire sprinklers shall only be sealed in a manner that is recommended by the manufacturer.				

BUILDING ENVELOPE (continued)					
Code Section	Focus Area	Code Description	Plan Drawing or Reference # to demonstrate compliance (N/A if not applicable)	Submitter Notes (e.g. if "N/A" Please explain why requirement does not apply or is not demonstrated on plans/specs)	Plans Examiner Notes (in office use)
R402.4.1.2	Air Leakage Testing	The building or dwelling unit shall be tested and verified as having an air leakage rate not exceeding three air changes per hour. Testing shall be conducted in accordance with RESNET/ICC 380, ASTM E779 or ASTM E1827 and reported at a pressure of 0.2 inch w.g. (50 Pascals)			Building Condition: Residential Air Leakage Testing
R402.4.4	Rooms containing fuel-burning appliances	Where open combustion air ducts provide combustion air to open combustion fuel-burning appliances, the appliances and combustion air opening shall be located outside the building thermal envelope or enclosed in a room that is isolated from inside the thermal envelope			
R402.4.5	Recessed lighting	Recessed luminaires installed in the building thermal envelope shall be sealed to limit air leakage between conditioned and unconditioned spaces. Recessed luminaires shall be IC-rated and labeled as having an air leakage rate of not greater than 2.0 cfm when tested in accordance with ASTM E283 at a pressure differential of 1.57 psf. Recessed luminaires shall be sealed with a gasket or caulked between the housing and the interior wall or ceiling covering.			

HEATING, VENTILATING AND AIR CONDITIONING					
R403.1	Controls	At least one thermostat shall be provided for each separate heating and cooling system.			
R403.1.1	Programmable thermostat	Where the primary heating system is a forced-air furnace, at least one programmable thermostat shall be installed and must include the capability to set back or temporarily operate the system to maintain zone temperatures down to 55°F or up to 85°F.			
R403.1.2	Heat pump supplementary heat	Heat pumps having supplementary electric-resistance heat shall have controls that, except during defrost, prevent supplemental heat operation when the heat pump compressor can meet the heating load.			
R403.3.1	Duct Insulation	Supply ducts in attics shall be insulated to a minimum of R-8. All other ducts shall be insulated to a minimum of R-6.			
R403.3.2	Duct Sealing	Ducts, air handlers, and filter boxes shall be sealed in accordance with the International Mechanical Code or International Residential Code.			
R403.3.3	Duct Testing	Ducts locate outside the building thermal envelope shall be pressure tested to determine air leakage to comply with this Section.			
R403.3.5	Building cavities	Building framing cavities shall not be used as ducts or plenums.			
R403.4	Mechanical System Piping Insulation	Mechanical system piping capable of carrying fluids above 105°F or below 55°F shall be insulated to a minimum of R-3.			
R403.6	Mechanical Ventilation	The building shall be provided with ventilation that meets the requirements of the International Residential Code or International Mechanical Code, as applicable, or with other approved means of ventilation. Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating.			
R403.7	Equipment Sizing	Heating and cooling equipment shall be sized in accordance with ACCA Manual S based on building loads calculated in accordance with ACCA Manual J or other approved heating and cooling calculation methodologies.			
R403.8	Systems serving multiple dwelling units	Systems serving multiple dwelling units shall comply with Sections C403 and C404 of the International Energy Conservation Code—Commercial Provisions instead of Section R403.			
R403.9	Snowmelt Systems Controls	Snow- and ice-melting systems, supplied through energy service to the building, shall include automatic controls capable of shutting off the system when the pavement temperature is above 50°F, and no precipitation is falling and an automatic or manual control that will allow shutoff when the outdoor temperature is above 40°F.			
R403.9.2	Renewable energy offset	Energy use by snow and ice melt systems shall be offset by on-site renewable energy generation equipment designed to provide 34,425 BTUs per square foot of installed ice melt system per year.			Building Condition: Outdoor heating offset by renewables
R404.1	Lighting	Not less than 90 percent of permanently installed lighting fixtures shall contain only high-efficacy light sources.			

# 2020 Residential Energy Code Prescriptive Measures Checklist for Alterations



2020  
City of Boulder  
Energy Conservation Code

**Directions: This checklist is ONLY for Level 1 & Level 2 Alterations. Complete the checklist by indicating where in the permit plans each code section is met. For code provisions that don't apply indicate N/A. The complete 2020 Energy Code can be downloaded from [www.BoulderEnergyCode.com](http://www.BoulderEnergyCode.com).**

Project Address:

Date:

Code Section	Focus Area	Code Description	Plan Drawing or Reference # to demonstrate compliance (N/A if not applicable)	Submitter Notes (e.g. If "N/A" Please explain why requirement does not apply or is not demonstrated on plans/specs)	Plans Examiner Notes (in office use)
<b>BUILDING ENVELOPE</b>					
R402.1.2	INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT	FENESTRATION MAX U-FACTOR (Does not include skylights)	0.27		
		SKYLIGHT MAX U-FACTOR	0.5		Building Inspection: Residential Window Certification
		GLAZED FENESTRATION MAX SHGC	0.4		
		CEILING MIN R-VALUE	R-49		
		WOOD FRAME WALL MIN R-VALUE	R-20 or R-13 cavity +R-5 continuous		
		MASS WALL MIN R-VALUE	R-13 or R-17 if >50% of insulation on interior		
		FLOOR MIN R-VALUE	R-30 or fill cavity (min R-19)		
		BASEMENT WALL MIN R-VALUE	R-15 continuous or R-19 cavity (R-13 cavity + R-5 continuous acceptable)		
		SLAB MIN R-VALUE & DEPTH	R-10, 2ft Additional R-5 continuous for heated slabs		
		CRAWL SPACE WALL MIN R-VALUE	R-15 continuous or R-19 cavity (R-13 cavity + R-5 continuous acceptable)		
R402.2.1	Ceilings with attic spaces	Where code requires R-49 insulation in the ceiling, installing R38 over 100 percent of the ceiling area requiring insulation shall satisfy the requirement for R-49 insulation wherever the full height of uncompressed R-38 insulation extends over the wall top plate at the eaves			
R402.2.2	Ceilings without attic spaces	Where the design of the roof/ceiling assembly does not allow sufficient space for the required insulation, the minimum required insulation for such roof/ceiling assemblies shall be R-30. This reduction of insulation from the requirements is limited to 500 square feet or 20 percent of the total insulated ceiling area, whichever is less and shall not apply to the U-factor alternative approach. If using include supporting documentation for exception.			
R402.2.3	Eave Baffles	For air permeable insulations in vented attics, a baffle shall be installed adjacent to soffit and eave vents. Baffles shall maintain an opening equal or greater than the size of the vent. The baffle shall extend over the top of the attic insulation.			
R402.2.4	Access Hatches & Doors	Access doors from conditioned spaces to unconditioned spaces (e.g., attics and crawl spaces) shall be weatherstripped and insulated to a level equivalent to the insulation on the surrounding surfaces.			



Code Section	Focus Area	Code Description	Plan Drawing or Reference # to demonstrate compliance (N/A if not applicable)	Submitter Notes (e.g. if "N/A" Please explain why requirement does not apply or is not demonstrated on plans/specs)	Plans Examiner Notes (in office use)
R402.2.5	Mass walls	Mass walls where used as a component of the building thermal envelope shall be one of the following: 1. Above-ground walls of concrete block, concrete, insulated concrete form, masonry cavity, brick but not brick veneer, adobe, compressed earth block, rammed earth, solid timber or solid logs. 2. Any wall having a heat capacity greater than or equal to 6 Btu/ft <sup>2</sup> • °F			
R402.2.6	Steel-frame ceilings, walls and floors	Steel-frame ceilings, walls, and floors shall comply with the insulation requirements of Table R402.2.6			
R402.2.7	Walls with partial structural sheathing	Where Section R402.1.2 requires continuous insulation on exterior walls and structural sheathing covers 40 percent or less of the gross area of all exterior walls, the required continuous insulation R-value shall be permitted to be reduced by an amount necessary, but not more than R-3 to result in a consistent total sheathing thickness on areas of the walls covered by structural sheathing.			
R402.2.8	Floors	Floor framing-cavity insulation shall be installed to maintain permanent contact with the underside of the subfloor decking.			
R402.2.9	Basement walls	Walls associated with conditioned basements shall be insulated from the top of the basement wall down to 10 feet below grade or to the basement floor, whichever is less. Walls associated with unconditioned basements shall meet this requirement unless the floor overhead is insulated in accordance with Sections R402.1.1 and R402.2.7			
R402.2.10	Slab-on-grade Floors	Insulation shall extend downward from the top of the slab on the outside or inside of the foundation wall. Insulation located below grade shall be extended the distance provided in Table R402.1.1 by any combination of vertical insulation, insulation extending under the slab or insulation extending out from the building. Insulation extending away from the building shall be protected by pavement or by a minimum of 10 inches (254 mm) of soil. The top edge of the insulation installed between the exterior wall and the edge of the interior slab shall be permitted to be cut at a 45-degree angle away from the exterior wall.			
R402.2.11	Crawl Space Walls	As an alternative to insulating floors over crawl spaces, crawl space walls shall be permitted to be insulated when the crawl space is not vented to the outside. Crawl space wall insulation shall be permanently fastened to the wall and extend downward from the floor to the finished grade level and then vertically and/or horizontally for at least an additional 24 inches. Exposed earth in unvented crawl space foundations shall be covered with a continuous Class I vapor retarder in accordance with the International Building Code or International Residential Code, as applicable.			
<b>HEATING, VENTILATING AND AIR CONDITIONING</b>					
R403.3.1	Duct Insulation	Supply and return ducts in attics shall be insulated to an R-value of not less than R-8 for ducts 3 inches in diameter and larger and not less than R-6 for ducts smaller than 3 inches in diameter.			
R403.3.4	Duct leakage	The total leakage of the ducts, where measured in accordance with Section R403.3.3. The total leakage shall be less than or equal to 4 cubic feet per minute per 100 square feet of conditioned floor area			
R403.5.3	Hot water pipe insulation	Insulation for hot water piping with a thermal resistance, Rvalue, of not less than R-3 shall be applied to the following: 1. Piping 3/4 inch and larger in nominal diameter. 2. Piping serving more than one dwelling unit. 3. Piping located outside the conditioned space. 4. Piping from the water heater to a distribution manifold. 5. Piping located under a floor slab. 6. Buried piping. 7. Supply and return piping in recirculation systems other than demand recirculation systems.			