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103.2 Information required on construction documents

1. Designation of the Thermal Building Envelope on the plans
2. Insulation Material and their R Value
3. Fenestration U and SHGC values
4. Area weighted U factor & SHGC calculations
5. Mechanical system design criteria (Manual J & S)
6. Mechanical and Water heating equipment types, sizes and efficiencies
7. Equipment and system controls
8. Duct sealing, duct & pipe insulation and locations
9. Air Sealing details

103.4 Amended construction documents shall be resubmitted for approval

104.2 Required Energy inspections

- **104.2.1** Footing and foundation inspection for insulation on buried plumbing
- **104.2.2** Framing (Predrywall) inspection for air sealing, insulation, U and SHGC values
- **104.2.3** Plumbing insulation and control inspection
- **104.2.4** Mechanical inspection of system size & efficiency, duct insulation, duct leakage testing, programmable thermostat and minimum fan efficiency
- **104.2.5** Final inspection of attic insulation and high-efficacy lamps

303.1.1.1 Attic insulation depth marker every 300 sqft. R value certificate for installed insulation with thickness and R value for SPF included on certificate

303.1.3 Fenestration product rating chart on every window with U – factor, SHGC and Visible Transmission

303.2 Insulation installation to manufacturer's instructions and IBC / IRC requirements

401.3(M) Certificate posted on a wall where the furnace is located, a utility room or other approved location with system R or U values of system components, SHGC and mechanical efficiencies

402.1.1 (P) Building Envelope General exemptions for < 3.4 Btu/h/sqft or 1.0 watt/sqft

402.1.2 (P) Prescriptive requirements for assembly components

Fenestration	U – Factor	≤ 0.35
Skylight	U – Factor	≤ 0.55
Solar Heat Gain Coefficient	SHGC value	≤ 0.25
Ceiling	R – value	R - 38
Walls	R – value	R – 20 or 13 + 5 ci
Floors	R – value	R - 19
Crawlspace / Basement	R value	R – 5 ci or R – 13 batt

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402.2.1 R-30 ceiling insulation minimum required in all areas (limited to 500 sqft or 20% of total ceiling area). Uncompressed R – 30 insulation over the exterior wall top plate will be deemed to meet the R-38 requirement.

402.2.3 Eave baffle required in vented attics adjacent to soffit or eave vents and maintain same size as vent and extend over the top of air permeable insulation.

402.2.4 Attic access hatches and doors must be weather stripped and insulated to same level as surrounding spaces. A retainer is required to prevent loose insulation from spilling into the living area. Vertical attic doors must have a U factor on .35 or less.

402.2.6 Steel framing has increased insulation values. See chart 402.2.6

402.2.8 Floor insulation will be installed with permanent contact to underside of subfloor decking or meet the floor insulation value and completely insulate the floor rim joist area to wall values.

402.2.11 Crawlspace walls may be insulated if not vented to exterior using alternative method with horizontal insulation extending 24 inches and all exposed earth covered with a Class 1 vapor retarder. Joints shall be lapped 6 inches and be taped or sealed. Vapor retarder will extend at least 6 inches up stem wall.

402.4 (M) Air leakage will be tested with a Blower Door and limited to 3 ACH (Air Changes per Hour) at 50 Pascals. Written results will be provided to the code official.

402.4.2 Wood burning fireplaces will have tight fitting flue dampers or doors and an outdoor combustion air source.

402.4.4 Rooms containing a fuel burning appliance with open combustion air ducts, the ducts will be insulated where they pass through conditioned space to a minimum R-8 value.

402.4.5 Recessed Lights will be IC rated & Air tight (<2 cfm @ 75 Pa). Seal building envelope penetration using gasket or caulk

402.5 The maximum area weighted average for fenestration SHGC factor is .50

402.4.1.1 Cavities within corner and headers or framing walls shall be insulated by completely filling the cavity with a material that has an R-3 per inch value. Continuous air barrier is required on exterior from top plate to foundation ≤ 8 Perms

403.1 (M) Programmable thermostat with daily schedule with set back capabilities with initial programming set point no higher than 70° F for heat and 78° F for cooling

403.3.1 (P) Duct insulation on supply and return ducts will be a minimum of R-8 on ducts greater than 3 inches in diameter and R-6 on ducts less than 3 inches. Ducts located inside the building envelope are exempted.

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403.3.2 (M) Ducts, air handlers and filter boxes shall be sealed per the IRC or IMC. Air Impermeable spray foam products are permitted without additional joint seals.

403.3.2.1 Air handlers will have a manufacturer's designation of no greater than 2% at design rated flow.

403.3.3 (P) Duct tightness verification required (@ 25 Pa) Written results will be provided to the code official.

1. Rough-in test ≤ 4 cfm / 100 Sqft of conditioned area. Where the air handler is not installed, leakage is limited to 3 cfm/100 Sqft
2. Post construction test ≤ 4 cfm / 100 Sqft of conditioned area

403.2.3 (M) Building cavities may not be used as supply ducts

403.3 (M) Mechanical system piping requires R – 3 insulation if carrying fluids above 105° or below 55°

403.5.1.1 (M) Circulating hot water systems using a dedicated return or cold water line has controls that will automatically turn the pump off when the water in the circulating loop is at the desired temperature and when there is no hot water demand.

403.5.3 (P) Minimum R-3 insulation will be used on hot water piping ¾ " and larger, piping serving more than 1 unit, piping outside the conditioned space, piping from a water heater to a distribution manifold, piping under a slab floor, buried in piping or hot and cold piping on recirculation systems other than demand systems.

403.6 (M) Mechanical ventilation outdoor intakes and exhaust vents will have automatic or gravity dampers that close when the system is not in operation.

403.6.1 (M) Range hoods, in-line fans and bathroom / utility room ventilation will meet vent fan efficiencies - < 10 cfm is 1.4 cfm/watt > 10 cfm is 2.8 cfm/watt

403.7 (M) Manual J and S calculations are required for HVAC system sizing

403.10.2 (M) Electric power to pool and spa heaters will be controlled by a ready accessible on / off switch within 3 feet of the heater.

403.10.3 (M) Timer switches shall be installed on pool and spa heaters and pump motors.

403.10.4 (M) Outdoor heated pools and spas will have a vapor retardant cover

404.1 (M) Lighting Requirement 75% of lamps are high efficacy lamps and can use lamp or fixture calculation method options

404.1.1 (M) Fuel gas lamp shall not have continuous burning pilot lights

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Component	Air Barrier Criteria	Insulation Criteria
General requirements	A continuous air barrier shall be installed in the building envelope. The 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 method
Ceiling / attic	The air barrier in any drop ceiling / soffit shall be aligned with the insulation and any gaps in the air barrier shall be sealed. Access opening, drop down stairways or knee wall doors to unconditioned attic spaces shall be sealed	The insulation in any dropped ceiling / soffit shall be aligned with the air barrier.
Walls	The junction of the foundation and sill plate shall be sealed. The junction of the top plate and the top of the exterior wall shall be sealed. Knee walls shall be sealed	Cavities within corners and headers of frame walls shall be insulated by completely filling the cavity with a material having a thermal resistance of R-3 per inch minimum. Exterior thermal envelope insulation for framed walls shall be installed in substantial contact and continuous alignment with the air barrier
Windows, skylights and doors	The space between window/door jambs and framing and skylights and framing shall be sealed.	
Rim Joist	Rim joist shall include the air barrier	Rim Joist shall be insulated
Floors (including above garage and cantilevered floors	The air barrier shall be at any exposed edge of insulation	Floor framing cavity insulation shall be installed to maintain permanent contact with the underside of subflooring, or floor framing cavity insulation shall be permitted to be in contact with the top side of the sheathing or continuous insulation on the underside of floor framing and extends from the bottom to the top of all perimeter floor framing members.
Crawl space walls	Exposed earth in unvented crawl spaces shall be covered with a Class 1 vapor retarder with overlapping joints taped	Where provided instead of floor insulation, insulation shall be permanently attached to the crawl space walls.

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Component	Air Barrier Criteria	Insulation Criteria
Shaft, 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 separations	Air sealing shall be provided between the garage and conditioned spaces	
Recessed Lighting	Recessed light fixtures installed in the building thermal envelope shall be sealed to the drywall.	Recessed light fixtures installed in the building thermal envelope shall be air tight and IC rated.
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	The air barrier installed at exterior walls adjacent to showers and tubs shall separate them from the showers and tubs.	Exterior walls adjacent to showers and tubs shall be insulated
Electrical/phone box on exterior walls	The air barrier shall be installed behind the electrical or communication boxes or air sealed boxes shall be sealed	
HVAC register boots	HVAC register boots that penetrate building thermal envelope shall be sealed to the subfloor or drywall	
Concealed sprinklers	When required to be sealed, concealed fire sprinkler shall be sealed in a manner that is recommended by the manufacture. Caulking or other adhesive sealant shall not be used to fill voids between fire sprinkler cover plates and walls or ceilings	

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