

**DEVELOPMENT SERVICES – BUILDING INSPECTION****INSPECTION GUIDELINES:
TITLE 24 ENERGY REQUIREMENTS****INSPECTION CODE:** N/A**SCOPE:** RESIDENTIAL**APPLICABLE CODES:** 2016 CBC, CRC, CPC, CMC, CEC, CALGreen, CEnC, and PAMC

The information provided in this document is general and intended as a guide only. Each project is unique and additional requirements may be enforced as deemed appropriate.

GENERAL REQUIREMENTS**INSPECTION 501 – UNDERGROUND/SLAB PLUMBING**

- Verify that all water system piping is insulated for piping buried below grade. In addition, all domestic hot water pipes that are buried below grade must be installed in a waterproof and non-crushable casing or sleeve. (CEnC 150.0(j)2.A, CEnC 150.0(j)2.B)

INSPECTION 206 – SLAB ON GRADE

- Verify that slab edge insulation is installed where a hydronic system is installed. (CEnC 150.0(f))

INSPECTION 213 – JOIST AND UNDERFLOOR COMBO

- Verify that a Class I or Class II vapor retarder is installed in an unvented crawl space and shown on the approved plan. (CEnC 150.0(g))
- Verify that the contractor has a copy of the heating and space-conditioning equipment design to verify the size of the ductwork and insulation requirements. (CEnC 150.0(h), CALGreen 4.507.2)

INSPECTION 214 – UNDERFLOOR INSULATION

- Verify that vent baffles are installed and automotive undercoat paint is applied to the wood at the vent opening so that insulation shall be protected from damage, including that due to sunlight, moisture, wind, etc. (CEnC 150.0(j)3)

INSPECTION 216 – EXTERIOR SHEATHING/STRUCTURAL FRAME

- Verify that a caulk, gasket, weather-strip, or other sealant is installed between the slab foundation and the sill plate to limit infiltration and exfiltration. (CEnC 110.7)
- Verify that wall and roof framing will accommodate required insulation (need to cross check the CF1R sheets with structural frame requirements).

- Verify roof sheathing and attic gable end walls are radiant barrier type per Table 150.1-A, or per the CF1R sheets, as required. (CEnC 150.1(c)2, CEnC Table 150.1-A)

**TABLE 150.1-A
COMPONENT PACKAGE A-STANDARD BUILDING DESIGN**

			CLIMATE ZONES																
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
BUILDING ENVELOPE INSULATION																			
ROOFS/CEILINGS																			
Option A (meets §150.1(c)9A)																			
Continuous insulation above roof rafter	Roofing type	No air space ¹	NR	NR	NR	R-8	NR	NR	NR	R-8									
		With air space ²	NR	NR	NR	R-6	NR	NR	NR	R-6									
	Ceiling insulation		R-38	R-38	R-30	R-38	R-30	R-30	R-30	R-38									
	Radiant barrier		NR	REQ	NR														
Option B (meets §150.1(c)9A)																			
Below roof deck insulation³	Roofing type	No air space	NR	NR	NR	R-18	NR	NR	NR	R-18									
		With air space	NR	NR	NR	R-13	NR	NR	NR	R-13									
	Ceiling Insulation		R-38	R-38	R-30	R-38	R-30	R-30	R-30	R-38									
	Radiant Barrier		NR	REQ	REQ	NR	REQ	REQ	REQ	NR									

INSPECTION 220 – ALL TRADES

- Verify that all lighting is high efficacy per Table 150.0-A. (CEnC 150.0(k)1)
 - o For recessed downlight luminaires in ceilings:
 - Be listed as zero insulation clearance contact (IC) and be airtight (AT)
 - Be sealed with a gasket or caulk between the luminaire housing and the ceiling
 - Shall not be screw base sockets
 - Contain light sources that comply with References Joint Appendix JA8 and marked with “JA8-2016-E”
 - o For screw based luminaires:
 - Shall not be recessed downlight luminaires in ceilings
 - Contain light sources that comply with References Joint Appendix JA8 and marked with “JA8-2016-E”

- Verify that outdoor lighting meets one of the following (CEnC 150.0(k)3):
 - o Has ON and OFF switch
 - o Is controlled by photocell and motion sensor
 - o Or controlled by photocontrol and automatic time switch, astronomical time clock, or an energy management control system.

- Verify that U-factor and Solar Heat Gain Coefficient (SHGC) for windows and skylights comply with the table below, or CF1R sheets, if applicable. (Labels shall be attached to windows and remain until insulation inspection is approved.) (CEnC 150.1(c)3)
 - U-factor: The lower the U-factor, the greater resistance to heat flow (in and out) and the better its insulation value.
 - Solar Heat Gain Coefficient (SHGC): The lower the SHGC, the less solar heat it transmits.

BUILDING ENVELOPE

ROOFING PRODUCTS																		
Low-sloped	Aged solar reflectance	NR	0.63	NR	0.63	NR												
	Thermal emittance	NR	0.75	NR	0.75	NR												
Steep-sloped	Aged solar reflectance	NR	0.20	0.20	0.20	0.20	0.20	0.20	NR									
	Thermal emittance	NR	0.75	0.75	0.75	0.75	0.75	0.75	NR									
FENESTRATION																		
Maximum U-factor*		0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
Maximum SHGC		NR	0.25	NR	0.25	NR	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Maximum total area		20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Maximum west facing area		NR	5%	NR	5%	NR	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%

- Portions of supply-air and return air ducts and plenums of a space heating or cooling system shall either be insulated to a minimum installed level of R-6.0 (or any higher level required by CMC Section 605) or a minimum installed level of R-4.2 when entirely in conditioned space. (CEnC 150.0(m)1)
 - Connections of metal ducts and the inner core of flexible ducts shall be mechanically fastened. Openings shall be sealed with mastic, tape or other duct-closure system that meets the applicable requirements of UL 181, UL181A or UL 18 1B or aerosol sealant that meets the requirements of UL 723. If mastic or tape is used to seal openings greater than 1/4", the combination of mastic and either mesh or tape shall be used.
- Verify duct insulation R-value per Table 150.1-A, or per the CF1R sheets, as required. If insulation wrap is used, provide the bag with the label to verify number of wraps required for installed R-value. (CEnC 150.1(c)9)

**TABLE 150.1-A
COMPONENT PACKAGE A-STANDARD BUILDING DESIGN**

		CLIMATE ZONES																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
HVAC SYSTEM																		
Space heating¹¹	Electric-resistance allowed	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	
	If gas, AFUE	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	
	If heat pump, HSPF ⁹	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	
Space cooling	SEER	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	
	Refrigerant charge verification or fault indicator display	NR	REQ	NR	NR	NR	NR	NR	REQ	NR								
	Whole house fan ¹⁰	NR	NR	NR	NR	NR	NR	NR	REQ	NR								
Central system air handlers	Central fan integrated ventilation system fan efficacy	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	
Ducts¹²	Roof/ceiling options A & B	Duct insulation	R-8	R-8	R-6	R-8	R-6	R-6	R-6	R-8								
		§150.1(c)9A	NA															
	Roof/ceiling option C	Duct insulation	R-6															
		§150.1(c)9B	REQ															
Water heating	All buildings	System shall meet Section 150.1(c)8																

- Verify that all water system piping is insulated for the following (CEnC 150.0(j)2.A):
 - The first 5’ of hot and cold water pipes from the water heater and between tanks
 - All piping with a nominal diameter of 3/4" or larger
 - All piping associated with a domestic hot water recirculation system (regardless of the pipe diameter)
 - All hot water pipes from the heating source to the kitchen fixtures

- Verify that a receptacle is installed within 3’ from the water heater and accessible to the water heater with no obstructions. (CEnC 150.0(n)1.A)

- Verify the whole-building ventilation system per the approved plans and confirm a whole-building ventilation airflow field verification and diagnostic test is provided at Final Inspection. (CEnC 150.0(o))

- Verify that a minimum 200 amp panel is provided with a reserved space positioned at the opposite (load) end from the input feeder location or main breaker. The reserved space shall be permanently marked as “For Future Solar Electric.” (CEnC 110.10(e))

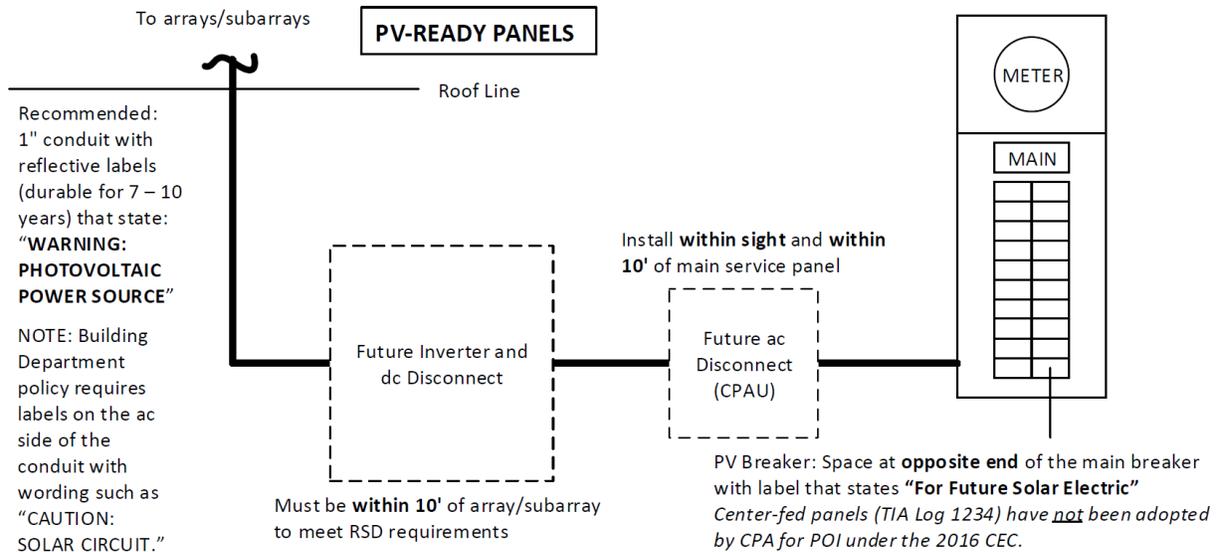


Figure CPA 072 – PV-Ready Panel

INSPECTION 235 – INSULATION

- Verify insulation covers top of ICAT recessed lighting cans. (CEnC 150.0(k)1)
- If radiant heat slab, verify whether wall insulation and slab edge insulation is required. (CEnC 150.0(f))
- Verify that insulation is flush and fully expanded with framing members. Insulation must have contact with drywall, floor and ceiling (i.e., fills cavity). (CEnC 150.0(a))
- Verify attic platform is fully insulated with required R-value. (CEnC 150.0(a))
- Verify if IIQ verification for insulation installation is required and provide report at time of inspection. If spray foam insulation is used, provide insulation certificate to verify R-rating. (CEnC 150.0(a))

INSPECTION 153 – GREEN BUILDING FINAL

- Contractor to provide all CF4R completer forms and HERS verification reports.

INSPECTION 101 – FINAL

- Verify HVAC system minimum efficiency/SEER requirements. (Must match the heating and air-conditioning system design as required in the GB-1 sheet.)
- If hot water recirculation system is installed, verify control devices (timer, thermostat, etc.) have been installed per title CF1R sheets.
- All light fixtures attached to a residence shall be high efficacy or install control.