Good Afternoon

HERS Verifications

and

California Residential Energy
Standards

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- 1973 Gas lines and energy storages
- 1977 Legislation created California Energy
 Commission and mandated residential
 energy standards.

1978 First energy standards based on

R-19 Attic

R-11 Walls

Single Pane windows (16%)

Trade-offs allowed based on equivalent heat loss.

1983 True performance based standards using computer simulation (CALPAS & Micropas most common programs).

Loud hue and cry from industry.

Standards delayed 11 months at last minute.

Increase in energy efficiency remarkable.

1983 - 1998 Energy standards periodically updated and tightened.

1999 Residential Energy Standards include optional HERS verification requirements.

2001 Emergency legislation mandated revised Residential Energy Standards. Revised standards took effect July 1, 2001.

2001 Residential Manual

Available in PDF format from the CEC

website:

Publication

P400-01-022

RESIDENTI

CALIFORNIA ENERGY COMMISSION

MANUAL

APPROVED

COMMISSION

for Compliance with the

2001 ENERGY Efficiency Standards

(for Low-Rise Residential Buildings)



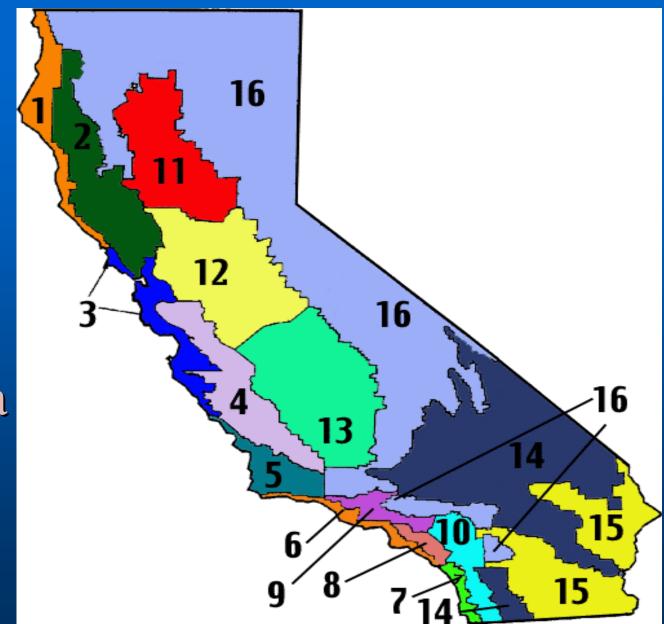
EXCEPTION: Building energy efficiency standards compliance documentation submitted prior to June 1, 2001 using the Multiple Orientation Alternative of Section 151(c), shall be used to determine compliance through December 31, 2001

Effective Date June 1, 2001

August 2001 P400-01-022

www.energy.ca.gov/title24

Gray Davis, Governor



California
Climate
Zones

Compliance Approaches

Mandatory Measures

Plus

Prescriptive Package

or

Computer Performance Methods

Prescriptive Packages

- No trade-offs allowed between measures
- Seldom used for new construction
- Very common for additions

40	0 NR East-racing glazing		ИK	U.4U	NK	U.4U	NK	NK	U.4U	U.4U	0.40	0.40	0.40	0.40	0.40	0.40			
40	NR	North-facing glazing			NR	0.40	NR	0.40	NR	NR	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	
R	NR	THERMAL MASS ⁵			NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
		SPACE-HEATING SY	STEM	6															
О	No	Electric-resistant allow	ved		No	No	No	No	No	No	No	No	No	No	No	No	No	No	
Ν	MIN	If gas, AFUE =			MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	
N	MIN	If heat pump, split sys	tem HS	SPF ⁸ =	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	
Ν	MIN	Single package syster	m HSP	F=	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	
		SPACE-COOLING SY	/STEM																
N	MIN	If split system A/C, SE	ER =		MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	
Q *	NR	Refrigerant charge an testing or TXV	d airflo	w	NR	REQ*	NR	NR	NR	NR	NR	REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	٠
N	MIN	If single package A/C,	SEER	:=	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	
		SPACE CONDITIONII	NG DU	ICTS															-
Q*	REQ*	Duct Sealing			REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	*
ny ⊏a:	Any st-racing	TYPE (System must n see §151 (b) 1 and (f) Tables 3-14 to 3-17) giazing		udget,	Any	Any u.4u	Any	Any NK	Any υ.4υ	Any 0.40	Any NR								
	rth-facing	•	NR	0.40	NR	0.40	NR	NR	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	NR	
TH	IERMAL I	MASS ⁵	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	-
SP.	ACE-HE	ATING SYSTEM ⁶																	-
Ele	ectric-resi	istant allowed	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	
			MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN		
lf h	eat pum	p, split system HSPF ⁸ =	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	
Single package system HSPF = MIN MIN			MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN			
SP	ACE-CO	OLING SYSTEM													***				-
If split system A/C, SEER = MIN MIN			MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN			
Refrigerant charge and airflow NR REQ* testing or TXV		NR	NR	NR	NR	NR	REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	NR				
If single package A/C, SEER = MIN MIN		MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN				
SP	ACE CO	NDITIONING DUCTS			0.00														-
Du	ct Sealin	g	REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	REQ*	r
DOMESTIC WATER-HEATING TYPE (System must meet budget, see §151 (b) 1 and (f) 8 and Tables 3-14 to 3-17) Any Any Any			Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	_		

Basic Prescriptive Package D												
Climate	Window	Roof	Window	Duct	TXV							
Zone	SHGC		U-Factor									
1	-	-	0.65	Sealed	-							
2	0.4	RB	0.65	Sealed	TXV							
3	-	-	0.75	Sealed	-							
4	0.4	RB	0.75	Sealed	-							
5	I	ı	0.75	Sealed	-							
6	-	•	0.75	Sealed	-							
7	0.4	-	0.75	Sealed	-							
8	0.4	RB	0.75	Sealed	TXV							
9	0.4	RB	0.75	Sealed	TXV							
10	0.4	RB	0.65	Sealed	TXV							
11	0.4	RB	0.65	Sealed	TXV							
12	0.4	RB	0.65	Sealed	TXV							
13	0.4	RB	0.65	Sealed	TXV							
14	0.4	RB	0.65	Sealed	TXV							
15	0.4	RB	0.65	Sealed	TXV							
16	-		0.6	Sealed								

Computer Performance Method

Trade-offs allowed between all measures except mandatory measures

EnergyPro Addendum - HERS Verification

HERS Required Verification These features must be confirmed and/or tested by a certified HERS rater under the supervision of a CEC approved HERS provider. The HERS rater must document the field verification and diagnostic testing of these measures on a form CF-6R. The HVAC System "Res HVAC" includes Refrigerant Charge and Airflow Credit (or a TXV). A certified HERS rater must provide veriffication of the TXV, or measure the Refrigerant Charge and Airflow. The HVAC System "Res HVAC" is using reduced duct leakage to comply and must have diagnostic site testing of duct leakage performed by a certified HERS Rater. The results of the diagnostic testing must be reported on a CF-6R Form. This house has tight construction with reduced infiltration and a target blower door test range between 786 and 1833 CFM at 50 pascals. The blower door test must be performed using the ASTM Standard Test Method for Determining Air Leakage Rate.

WARNING - If this house tests below 786 CFM at 50 pascals, the house must either be provided with a ventilation opening that will

increase the infiltration to this level (SLA=1.5) OR mechanical supply ventilation must be provided.

HERS Verified Measures

- 1. Tight Ducts
- 2. Reduced Infiltration
- 3. TXV
- 4. ACCA Manual D
- 5. Ducts in Conditioned Space
- 6. Reduced Duct Surface Area

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- 5. Support of organizations such as NRDC

6. Role or impact of Building Inspector organizations (CALBO & ICBO's)

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- 7. Availability of energy consultants (CABEC)

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- 8. CHEERS Proven track record in the state and able to work with CEC