



City of Huntington Beach
Department of Building & Safety
ENERGY EFFICIENCY STANDARDS

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New Residential Buildings with less than four habitable stories, for which a permit application is accepted on or after January 1st, 2010, shall conform with the requirements of Title 24 Building Energy Standards. The use of a consultant, specializing in T24 energy design, is recommended to prepare the energy analysis and forms necessary to show compliance with the State's requirements.

COMPLIANCE METHODS

There are two (2) acceptable compliance methods:

1. Performance method - Using California Energy Commission-approved computer programs.
2. Prescriptive method - Using State-approved alternate component packages indicated below.

TITLE 24, PART 6, CODE SECTION REFERENCES

- General Provision.....Section 100
- Mandatory requirements.....Section 111 through 119(d) and 150
- Performance methods.....Section 151(a) through (e)
- Prescriptive methods.....Section 151(a)(f)
- Energy Efficiency Standards for Additions and Alterations.....Sections 152

REQUIRE DOCUMENTATION

Mandatory Measures: Add mandatory notes per Title 24, Section 110-119 and 150 or completed (MF-1R) to the plans.

PERFORMANCE METHODS

1. Submit computer analysis by State approved software package.
2. Certificate of Compliance per Title 24, Part 1, Article 1, Section 10-103(a) 2A to the plans (CF-1R)
3. Add mandatory energy conservation features with applicable boxes check marked to the plans (MF-1R).
4. Show insulation envelope with R-values called out on the cross-section; show glazing U-values on the door/window schedules, identify thermal mass on the plans corresponding to CF-1R.

PRESCRIPTIVE METHODS

1. Show compliance with the prescriptive package on the plans.
2. Certificate of Compliance per Title 24, Part 1, Article 1, Section 10-103(a) 2A on (CF-1R).
3. Add mandatory energy conservation features with applicable boxes checked marked to the plans (MF-1R).
4. Show insulation envelope with R-value called out on the cross-section; show glazing U-values on the door/window schedules, identify thermal mass on the plans corresponding to CF-1R.

HELPFUL STATE PUBLICATIONS

- CEC-400-2008-001-CMF 2008 Building Energy Efficiency Standards for Residential and Non-Residential Building* - CEC-400-2008-016-CMF-REVI.
- *Available on-line from: California Energy Commission, Media and Public Communication Office, 1516 9th Street, MS #29, Sacramento, CA 95814-5512; www.energy.ca.gov/title24/2005. Phone: 916 / 654 – 5200.

ASHRAE HANDBOOK – 2005 FUNDAMENTALS**

**Available from technical bookstores or order from: ASHRAE, 1791 Tullie Circle N.E., Atlanta, GA 30329. Phone: 404 / 636 – 8400.

Footnotes to Prescriptive Packages (for Code Reference, See Publication CEC-400-2008-001-CMF)

- 1 The R-values shown for ceiling, wood frame wall and raised floor are for wood-frame construction with insulation installed between the framing members. For alternative construction assemblies, see §151(f)1A.
The heavy mass wall R-value in parentheses is the minimum R-value for the entire wall assembly if the wall weight exceeds 40 pounds per square foot. The light mass wall R-value in brackets is the minimum R-value for the entire assembly if the heat capacity of the wall meets or exceeds the result of multiplying the bracketed minimum R-value by 0.65. Any insulation installed on heavy or light mass walls must be integral with, or installed on the outside of, the exterior mass. The inside surface of the thermal mass, including plaster or gypsum board in direct contact with the masonry wall, shall be exposed to the room air. The exterior wall used to meet the R-value in parentheses cannot also be used to meet the thermal mass requirement.
- 2 The installed fenestration products shall meet the requirements of §151(f)3.
- 3 The installed fenestration products shall meet the requirements of §151(f)4.
- 4 If the package requires thermal mass, the thermal mass shall meet the requirements of §151(f)5.
- 5 Thermostats shall be installed in conjunction with all space-heating systems in accordance with §151(f)9.
- 6 HSPF means "heating seasonal performance factor."
- 7 Electric-resistance water heating may be installed as the main water heating source in Package C only if the water heater is located within the building envelope and a minimum of 25 percent of the energy for water heating is provided by a passive or active solar system.
- 8 As an alternative under Package E in climate zone 1, glazing with a maximum 0.57 U-factor and a 92 percent AFUE furnace or an 8.4 HSPF heat pump may be substituted for the Package E glazing U-factor requirement. All other requirements of Package E must be met.
- 9 As an alternative under Package E in climate zone 16, glazing with a maximum 0.57 U-factor and a 90 percent AFUE furnace or an 8.4 HSPF heat pump may be substituted for may be substituted for the Package E glazing U-factor requirement. All other requirements of Package E must be met.
- 10 A supplemental heating unit may be installed in a space served directly or indirectly by a primary heating system, provided that the unit thermal capacity does not exceed two kilowatts or 7,000 Btu/hr and is controlled by a time-limiting device not exceeding 60 minutes.

Basic and Alternate Component Compliance Package for New Residential Buildings in Climate Zone 6

	Basic Package C	Basic Package D	Package E (NEW 2010 Previous ALT-Package D)
	Climate Zone	Climate Zone	Climate Zone
Components	6	6	6
Building Envelope			
Insulation Minimums ¹			
Ceiling	R-38	R-30	R-38
Wood-frame walls	R-21	R-13	R-19
"Heavy" mass walls	NA	(R-2.44)	(R-2.44)
"Light mass" walls	NA	NA	NA
Below grade walls	NR	R0	R0
Slab Floor, Perimeter	R-7	NR	NR
Raised Floors	R-21	R-19	R-19
Concrete raised floors	NA	R0	R0
Radiant Barrier	NR	NR	NR
Fenestration			
Maximum U-Factor ²	0.42	0.40	0.57
Maximum Solar Heat Gain Coefficient (SHGC) ³	NR	0.40	0.40
Maximum Total Area	14%	20%	20%
Maximum West Facing Area	NR	NR	NR
Roofing			
Low-Sloped			
Aged Solar Reflectance	NR	NR	NR
Thermal Emittance	NR	NR	NR
Steep-Slope (Less Than 5lb/ft ²)			
Aged Solar Reflectance	NR	NR	NR
Thermal Emittance	NR	NR	NR
Steep-Slope (Greater Than 5lb/ft ²)			
Aged Solar Reflectance	0.15	0.15	0.15
Thermal Emittance	0.75	0.75	0.75
Thermal Mass⁴	REQ	NR	NR
Space Heating System⁵			
Electric Resistance	YES ⁷	NO	NO
Allowed:		MIN	MIN
If Gas, AFUE =	MIN	MIN	MIN
If Heat Pump: HSPF ⁶ =	MIN	MIN	MIN
Space Cooling System			
SEER =			
If split system, refrigerant* charge measurement or thermostatic expansion valve*	MIN NR	MIN NR	MIN NR
Central Forced Air Handlers			
Cooling Airflow and Watt Draw	NR	NR	NR
Central Fan Integrated Ventilation System Watt Draw	NR	REQ	REQ
Ducts*			
Duct Sealing	REQ	REQ	NR ⁸
Duct Insulation	R-8	R-4.2	R-4.2
Domestic Water Heating Type			
System must meet budget, see section 151(b) 1 or 151(f) 8	50 GALLONS OR MEET BUDGET	50 GALLONS OR MEET BUDGET	50 GALLONS OR MEET BUDGET

TYPICAL DEFINITIONS FOR TITLE 24 ENERGY STANDARDS

Certificate of Compliance – Residential New Construction (CF-1R)

The CF-1R summarizes the minimum energy performance specifications needed for new construction compliance, including HVAC capacity and the result of the heating and cooling load calculations need to be attached. The Standards require that a certificate of compliance be included on the plans. California Energy Code (CEC) approved Performance ACM software automatically generates CF-1R forms, which vary in some respect from the prescriptive CF-1R forms.

Mandatory Measures List (MF-1R)

This document is applicable for both prescriptive and performance compliance. This reference list needs to be part of the building plans to help builders and inspectors reference applicable mandatory measures in the Standards.

Prescriptive Package

The simplest approach in which each individual component of the proposed building must meet a prescribed minimum energy requirement. The prescriptive approach is the least flexible yet simplest compliance path. It is simple because an applicant need only show that a building meets each minimum or maximum level prescribed in the set of requirements contained in a package.

Performance Package

The use of Energy Commission-approved computer methods provides the most flexibility and accuracy in calculating energy use. Detailed accounting of energy *trade-offs* between measures is possible with this approach. While this approach requires the most effort, it also provides the greatest flexibility. The computer program automatically calculates the energy budget for space conditioning. The budget is determined from the standard design, a version of the building, which is upgraded or downgraded to achieve minimum compliance with the prescriptive Package D conservation features.

Fenestration (Glazing Area)

Fenestration area is defined as the area of all fenestration products (i.e., windows, skylights and glass doors) in exterior openings, including the sash or frame area. The nominal area (from nominal dimensions such as 4o4o) or rough opening is also acceptable. For details on calculating fenestration area for glass doors, see *Exterior Door*. Where the term "glazing area" is used in the standards it means the entire fenestration area, not just the area of glazing, unless stated otherwise.

Exterior Door

An exterior door is any openable opaque surface that separates conditioned and unconditioned space. A door with one half or less of the surface area as glazing is an exterior door. A door with more than 50 percent of its surface area made up of glazing is a fenestration product.

Energy Efficiency Ratio (EER)

The energy efficiency ratio (EER) is "the ratio of net cooling capacity (in Btu/hr) to total rate of electrical energy (in watts), of a cooling system under designated operating conditions, as determined using the applicable test method in the Appliance Efficiency Regulation or § 112."

Seasonal Energy Efficiency Ratio (SEER)

The total cooling of a central air conditioner or heat pump in Btu during 12 months divided by the total electric energy input in watt-hours during the same period.

Home Energy Rating (HERS)

A home energy rating involves an analysis of a home's construction plans and onsite inspections. Based on the home's plans, the Home Energy Rater uses an energy efficiency software package to perform an energy analysis of the home's design. This analysis yields a projected, pre-construction HERS Index. Upon completion of the plan review, the rater will work with the builder to identify the energy efficiency improvements needed to ensure the house will meet ENERGY STAR performance guidelines. The rater then conducts onsite inspections, typically including a blower door test (to test the leakiness of the house) and a duct test (to test the leakiness of the ducts). Results of these tests, along with inputs derived from the plan review, are used to generate the HERS Index score for the home.

HERS Index

The HERS Index is a scoring system established by the Residential Energy Services Network (RESNET) in which a home built to the specifications of the HERS Reference Home (based on the 2006 International Energy Conservation Code) scores a HERS Index of 100, while a net zero energy home scores a HERS Index of 0. The lower a home's HERS Index, the more energy efficient it is in comparison to the HERS Reference Home.

Each 1-point decrease in the HERS Index corresponds to a 1% reduction in energy consumption compared to the HERS Reference Home. Thus a home with a HERS Index of 85 is 15% more energy efficient than the HERS Reference Home and a home with a HERS Index of 80 is 20% more energy efficient.