



County of San Diego, Planning & Development Services
2008 BUILDING ENERGY EFFICIENCY STANDARDS
BUILDING DIVISION

LOW-RISE RESIDENTIAL BUILDINGS

The *California 2008 Building Energy Efficiency Standards* for low-rise residential buildings found in Title 24, Part 6, California Administrative Code, hereafter referred to as the “Residential Standards”, became effective January 1, 2010, and apply to low-rise residential occupancies, including:

- All single-family dwellings of any number of stories (Group R-3)
- All duplex (two-dwelling) buildings of any number of stories (Group R-3)
- All multifamily buildings with three or fewer habitable stories (Group R-1 and R-2)
- Additions and alterations to all of the above buildings

The purpose of this guidance document is to identify the different approaches for compliance with the Residential Standards for new buildings and to provide general information and guidelines for compliance with the prescriptive package method.

For additional information regarding the *2008 Building Energy Efficiency Standards*, please contact the California Energy Commission’s Energy Efficiency Hotline at:

(800) 772-3300 toll free in California or
(916) 654-5106
<http://www.energy.ca.gov/title24>

PLAN CHECK PHASE COMPLIANCE DOCUMENTATION:

The following energy compliance documents must be submitted with the building plans at the time of permit application:

- CF-1R**, *Certificate of Compliance*, shall be completed and made a permanent part of the plans. The documentation author and the responsible building designer are required to sign the certificate of compliance. There are three versions of the certificate of compliance. Complete the document that applies to the proposed project.
 - CF-1R: Residential New Construction and Additions Greater than 1,000 ft²
 - CF-1R ADD: Residential Additions
 - CF-1R ALT: Residential Alterations
- MF-1R**, *Mandatory Measures Summary*, shall be made a permanent part of the plans.

The following supplemental energy compliance documents may be required if applicable.

- WS-1R**, *Thermal Mass Worksheet Checklist*
- WS-2R**, *Area Weighted Average Calculation Worksheet*
- WS-3R**, *Solar Heat Gain Coefficient (SHGC)*
- CF-SR**, *Solar Water Heating Calculation Form*

The CF-SR is only available in electronic (Microsoft Excel) format. Contact the California Energy Commission Hotline for more information on how to access this calculation sheet or see the available computer programs for Residential Solar Water Heating online at:
http://www.energy.ca.gov/title24/2008standards/2008_computer_prog_list.html#solar.

CONSTRUCTION PHASE DOCUMENTATION:

CF-6R, Installation Certificates, must be completed and signed by the applicable person(s) responsible for installing regulated energy features and provided to the County of San Diego building inspector in the field during construction. The CF-6R certifies that the installed features, materials, components, or manufactured devices conform to the Residential Standards and Title 20 Appliance Efficiency Regulations.

CF-4R, Certificates of Field Verification and Diagnostic Testing, must be completed and signed/certified by a third-party HERS rater and provided to the County of San Diego building inspector in the field during construction when field verification and/or diagnostic testing is required for compliance. All new construction (conditioned, ducted residential buildings) using the prescriptive package compliance method requires field verification and/or diagnostic testing by a HERS rater and the CF-4R.

CF-6R and CF-4R forms are available for download from the California Energy Commission web site at: http://www.energy.ca.gov/title24/2008standards/residential_manual.html.

COMPLIANCE METHODS:

Prescriptive Packages: Consist of pre-defined minimum efficiency requirements for each building component and vary by climate zone (7, 10, 14, or 15) and package type (C, D, or E).

Performance Approach: This computer method allows for greater flexibility in meeting energy requirements. The computer software models the proposed building, calculates the energy budget and allows manipulation of the building’s energy features to comply with the Residential Standards. Computer software used must be approved by the California Energy Commission.

INSTRUCTIONS FOR FOLLOWING THE PRESCRIPTIVE PACKAGE METHOD:

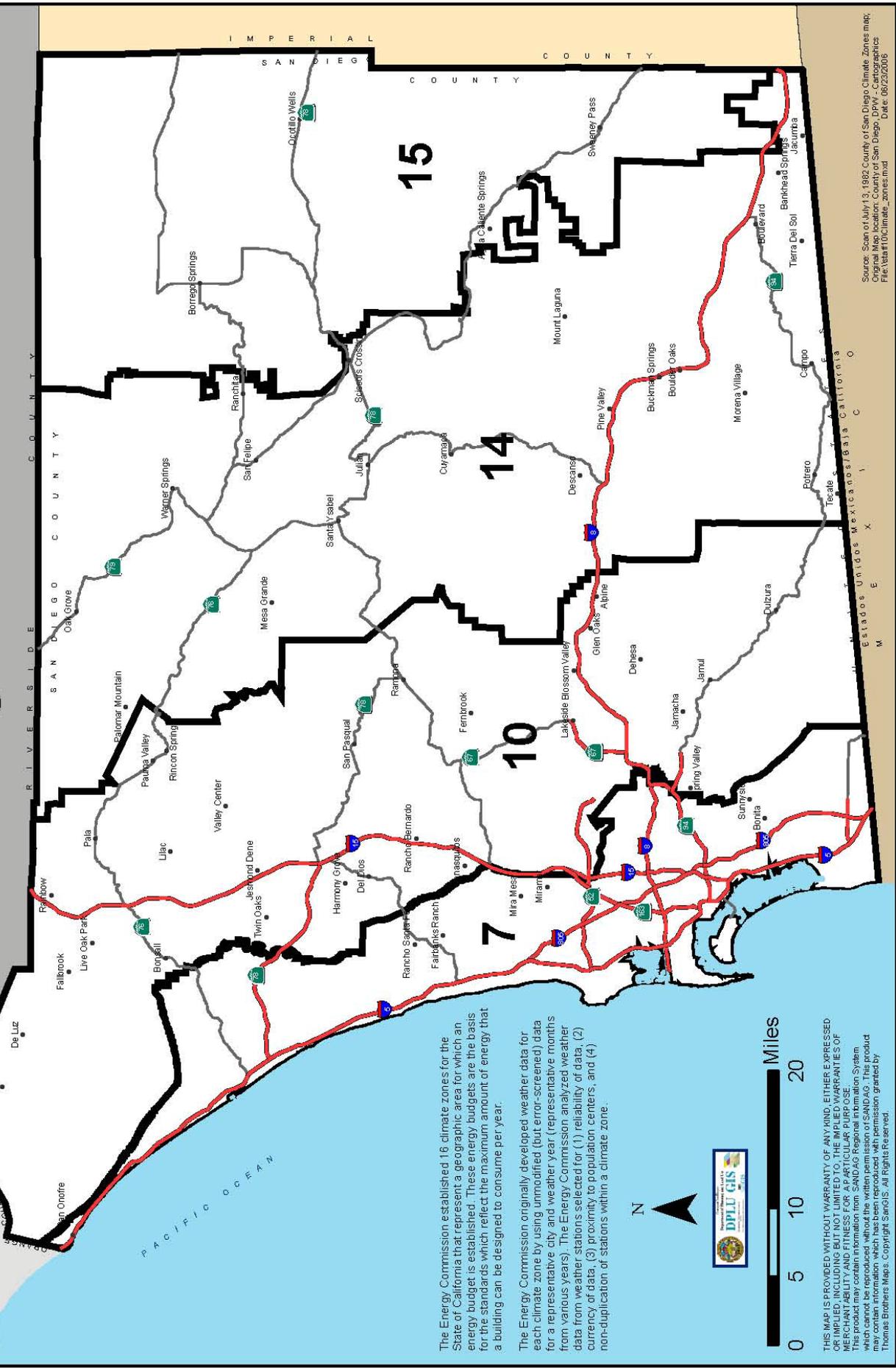
1. Determine the climate zone where the proposed project site is located. See Table A and the attached map of climate zones in the County of San Diego. For more specific climate zone information by address, use the California Climate Zones by Google Earth™ application available online at: http://www.energy.ca.gov/maps/building_climate_zones.html.
2. Select a prescriptive package (C, D, or E) and use the attached component package tables for the specific climate zone where the proposed project is located. Each building component must meet or exceed the minimum requirements listed in the table and the Residential Standards.
3. Complete the CF-1R using the component package table minimum requirements and project-specific information including conditioned floor area, fenestration areas, sizes of heating, cooling and water heating equipment, etc.

TABLE A: COUNTY OF SAN DIEGO CLIMATE ZONES*

7	10		14		15
Bonita	Alpine	Pala	Boulevard	Palomar Mountain	Agua Caliente Spr.
Del Mar	Barrett Junction	Pauma Valley	Campo	Pine Valley	Borrego Springs
La Mesa	Bonsall	Poway	Cuyamaca	Portrero	Ocotillo Wells
Lemon Grove	De Luz	Rainbow	Descanson	Ranchita	Vallecito Stage Sta.
Rancho Santa Fe	Del Dios	Ramona	El Capitan Dam	San Felipe	
San Luis Rey	Dulzura	Rincon Springs	Guatay	Santa Ysabel	
Vista	El Cajon	San Marcos	Henshaw Dam	Tecate	
	Escondido	San Pasqual	Jacumba	The Willows	
	Fallbrook	San Vicente Res.	Julian	Tierra del Sol	
	Harbison Canyon	Santee	Live Oak Springs	Warner Springs	
	Jamul	Spring Valley	Morena Village	Witch Creek	
	Lakeside	Sweetwater Res.	Mount Laguna	Wynola	
	Lower Otay Res.	Valley Center	Oak Grove		

*Climate zones noted for the areas above are general approximations. The specific climate zone will be determined by the site address.

San Diego Climate Zones



The Energy Commission established 16 climate zones for the State of California that represent a geographic area for which an energy budget is established. These energy budgets are the basis for the standards which reflect the maximum amount of energy that a building can be designed to consume per year.

The Energy Commission originally developed weather data for each climate zone by using unmodified (but error-screened) data for a representative city and weather year (representative months from various years). The Energy Commission analyzed weather data from weather stations selected for (1) reliability of data, (2) currency of data, (3) proximity to population centers, and (4) non-duplication of stations within a climate zone.





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Source: Scan of July 13, 1992 County of San Diego Climate Zones map;
Original Map location: County of San Diego, DPW - Cartographics
File: \ata\110\Climate_zones.mxd Date: 06/23/2006

CLIMATE ZONE 7: COMPONENT PACKAGES

COMPONENT	C	D	E
BUILDING ENVELOPE			
Insulation Minimums ¹ :			
Ceilings	R38	R30	R30
Walls:			
Wood-Frame Walls	R21	R13	R19
"Heavy Mass" Walls	NA	R2.44	R2.44
"Light Mass" Walls	NA	NA	NA
Below-Grade Walls	NA	R0	R0
Floors:			
Slab Floor Perimeter	R7	NR	NR
Raised Floors	R21	R19	R19
Concrete Raised Floors	NA	NA	R0
Radiant Barrier	NR	NR	NR
Roofing Products*:			
*Low-Sloped Roof – pitch ≤ 2:12			
Aged Solar Reflectance	NR	NR	NR
Thermal Emittance	NR	NR	NR
<i>Solar Reflectance Index (SRI) Alternative</i>	<i>NR</i>	<i>NR</i>	<i>NR</i>
*Steep Sloped Roof – pitch > 2:12 (less than 5 lb/ft ²)			
Aged Solar Reflectance	NR	NR	NR
Thermal Emittance	NR	NR	NR
<i>Solar Reflectance Index (SRI) Alternative</i>	<i>NR</i>	<i>NR</i>	<i>NR</i>
*Steep Sloped Roof – pitch > 2:12 (5 lb/ft ² or more)			
Aged Solar Reflectance	0.15	0.15	0.15
Thermal Emittance	0.75	0.75	0.75
<i>Solar Reflectance Index (SRI) Alternative</i>	<i>10</i>	<i>10</i>	<i>10</i>
FENESTRATION			
Maximum U-Factor ²	0.38	0.40	0.57
Maximum Solar Heat Gain Coefficient (SHGC) ³	0.40	0.40	0.25
Maximum Total Area	14%	20%	20%
Maximum West Facing Area	5%	5%	5%
THERMAL MASS⁴			
Thermal Mass Required	REQ	NR	NR
SPACE-HEATING^{5, 7 (PKG D & E)} See Table B for MIN values			
Electric-Resistant Allowed	YES	NO	NO
AFUE (Gas)	MIN	MIN	MIN
HSPF ⁶ (Heat Pump)	MIN	MIN	MIN
SPACE-COOLING See Table C for MIN values			
SEER (Seasonal Energy Efficiency Ratio)	MIN	MIN	MIN
Refrigerant Charge Measurement or Charge Indicator Display (for Split System)	NR	NR	NR
Central Forced Air Handler:			
Cooling Airflow and Watt Draw	NR	NR	NR
Central Fan Integrated Ventilation System Watt Draw	REQ	REQ	REQ
DUCTS			
Duct Sealing	REQ	REQ	REQ
Duct Insulation	R-8	R-4.2	R-4.2
WATER HEATING See Table D for minimum requirements			
Water heating system shall meet §151(f)8 or §151(b)1 for all packages (C, D, and E)			

LEGEND: NR = Not Required, NA = Not Allowed, REQ = Required, MIN = Shall meet minimum

CLIMATE ZONE 10: COMPONENT PACKAGES

COMPONENT	C	D	E
BUILDING ENVELOPE			
Insulation Minimums ¹ :			
Ceilings	R49	R30	R30
Walls:			
Wood-Frame Walls	R25	R13	R19
"Heavy Mass" Walls	NA	R2.44	R2.44
"Light Mass" Walls	NA	NA	NA
Below-Grade Walls	NA	R0	R0
Floors:			
Slab Floor Perimeter	R7	NR	NR
Raised Floors	R30	R19	R19
Concrete Raised Floors	NA	R0	R0
Radiant Barrier	REQ	REQ	REQ
Roofing Products*:			
*Low-Sloped Roof – pitch ≤ 2:12			
Aged Solar Reflectance	NR	NR	NR
Thermal Emittance	NR	NR	NR
<i>Solar Reflectance Index (SRI) Alternative</i>	<i>NR</i>	<i>NR</i>	<i>NR</i>
*Steep Sloped Roof – pitch > 2:12 (less than 5 lb/ft ²)			
Aged Solar Reflectance	0.20	0.20	0.20
Thermal Emittance	0.75	0.75	0.75
<i>Solar Reflectance Index (SRI) Alternative</i>	<i>16</i>	<i>16</i>	<i>16</i>
*Steep Sloped Roof – pitch > 2:12 (5 lb/ft ² or more)			
Aged Solar Reflectance	0.15	0.15	0.15
Thermal Emittance	0.75	0.75	0.75
<i>Solar Reflectance Index (SRI) Alternative</i>	<i>10</i>	<i>10</i>	<i>10</i>
FENESTRATION			
Maximum U-Factor ²	0.38	0.40	0.57
Maximum Solar Heat Gain Coefficient (SHGC) ³	0.40	0.40	0.40
Maximum Total Area	16%	20%	20%
Maximum West Facing Area	5%	5%	5%
THERMAL MASS⁴			
Thermal Mass Required	REQ	NR	NR
SPACE-HEATING^{5, 7 (PKG D & E)} See Table B for MIN values			
Electric-Resistant Allowed	YES	NO	NO
AFUE (Gas)	MIN	MIN	MIN
HSPF ⁶ (Heat Pump)	MIN	MIN	MIN
SPACE-COOLING See Table C for MIN values			
SEER (Seasonal Energy Efficiency Ratio)	MIN	MIN	MIN
Refrigerant Charge Measurement or Charge Indicator Display (for Split System)	REQ	REQ	REQ
Central Forced Air Handler:			
Cooling Airflow and Watt Draw	REQ	REQ	REQ
Central Fan Integrated Ventilation System Watt Draw	REQ	REQ	REQ
DUCTS			
Duct Sealing	REQ	REQ	REQ
Duct Insulation	R-8	R-6	R-6
WATER HEATING See Table D for minimum requirements			
Water heating system shall meet §151(f)8 or §151(b)1 for all packages (C, D, and E)			

LEGEND: NR = Not Required, NA = Not Allowed, REQ = Required, MIN = Shall meet minimum

CLIMATE ZONE 14: COMPONENT PACKAGES

COMPONENT	C	D	E
BUILDING ENVELOPE			
Insulation Minimums ¹ :			
Ceilings	R49	R38	R38
Walls:			
Wood-Frame Walls	R29	R21	R21
"Heavy Mass" Walls	NA	R4.76	R4.76
"Light Mass" Walls	NA	NA	NA
Below-Grade Walls	NA	R0	R0
Floors:			
Slab Floor Perimeter	R7	NR	NR
Raised Floors	R30	R19	R19
Concrete Raised Floors	NA	R8	R8
Radiant Barrier	REQ	REQ	REQ
Roofing Products*:			
*Low-Sloped Roof – pitch ≤ 2:12			
Aged Solar Reflectance	NR	NR	NR
Thermal Emittance	NR	NR	NR
<i>Solar Reflectance Index (SRI) Alternative</i>	<i>NR</i>	<i>NR</i>	<i>NR</i>
*Steep Sloped Roof – pitch > 2:12 (less than 5 lb/ft ²)			
Aged Solar Reflectance	0.20	0.20	0.20
Thermal Emittance	0.75	0.75	0.75
<i>Solar Reflectance Index (SRI) Alternative</i>	<i>16</i>	<i>16</i>	<i>16</i>
*Steep Sloped Roof – pitch > 2:12 (5 lb/ft ² or more)			
Aged Solar Reflectance	0.15	0.15	0.15
Thermal Emittance	0.75	0.75	0.75
<i>Solar Reflectance Index (SRI) Alternative</i>	<i>10</i>	<i>10</i>	<i>10</i>
FENESTRATION			
Maximum U-Factor ²	0.38	0.40	0.57
Maximum Solar Heat Gain Coefficient (SHGC) ³	0.40	0.40	0.25
Maximum Total Area	14%	20%	20%
Maximum West Facing Area	5%	5%	5%
THERMAL MASS⁴			
Thermal Mass Required	REQ	NR	NR
SPACE-HEATING^{5, 7 (PKG D & E)}			
See Table B for MIN values			
Electric-Resistant Allowed	YES	NO	NO
AFUE (Gas)	MIN	MIN	MIN
HSPF ⁶ (Heat Pump)	MIN	MIN	MIN
SPACE-COOLING			
See Table C for MIN values			
SEER (Seasonal Energy Efficiency Ratio)	MIN	MIN	MIN
Refrigerant Charge Measurement or Charge Indicator Display (for Split System)	REQ	REQ	REQ
Central Forced Air Handler:			
Cooling Airflow and Watt Draw	REQ	REQ	REQ
Central Fan Integrated Ventilation System Watt Draw	REQ	REQ	REQ
DUCTS			
Duct Sealing	REQ	REQ	REQ
Duct Insulation	R-8	R-8	R-8
WATER HEATING			
See Table D for minimum requirements			
Water heating system shall meet §151(f)8 or §151(b)1 for all packages (C, D, and E)			

LEGEND: NR = Not Required, NA = Not Allowed, REQ = Required, MIN = Shall meet minimum

CLIMATE ZONE 15: COMPONENT PACKAGES

COMPONENT	C	D	E
BUILDING ENVELOPE			
Insulation Minimums ¹ :			
Ceilings	R49	R38	R38
Walls:			
Wood-Frame Walls	R29	R21	R21
"Heavy Mass" Walls	NA	R4.76	R4.76
"Light Mass" Walls	NA	NA	NA
Below-Grade Walls	NA	R0	R0
Floors:			
Slab Floor Perimeter	R7	NR	NR
Raised Floors	R30	R19	R19
Concrete Raised Floors	NA	R4	R4
Radiant Barrier	REQ	REQ	REQ
Roofing Products*:			
*Low-Sloped Roof – pitch ≤ 2:12			
Aged Solar Reflectance	0.55	0.55	0.55
Thermal Emittance	0.75	0.75	0.75
Solar Reflectance Index (SRI) Alternative	64	64	64
*Steep Sloped Roof – pitch > 2:12 (less than 5 lb/ft ²)			
Aged Solar Reflectance	0.20	0.20	0.20
Thermal Emittance	0.75	0.75	0.75
Solar Reflectance Index (SRI) Alternative	16	16	16
*Steep Sloped Roof – pitch > 2:12 (5 lb/ft ² or more)			
Aged Solar Reflectance	0.15	0.15	0.15
Thermal Emittance	0.75	0.75	0.75
Solar Reflectance Index (SRI) Alternative	10	10	10
FENESTRATION			
Maximum U-Factor ²	0.38	0.40	0.57
Maximum Solar Heat Gain Coefficient (SHGC) ³	0.40	0.35	0.25
Maximum Total Area	16%	20%	20%
Maximum West Facing Area	5%	5%	5%
THERMAL MASS⁴			
Thermal Mass Required	REQ	NR	NR
SPACE-HEATING^{5, 7 (PKG D & E)}			
See Table B for MIN values			
Electric-Resistant Allowed	YES	NO	NO
AFUE (Gas)	MIN	MIN	MIN
HSPF ⁶ (Heat Pump)	MIN	MIN	MIN
SPACE-COOLING			
See Table C for MIN values			
SEER (Seasonal Energy Efficiency Ratio)	MIN	MIN	MIN
Refrigerant Charge Measurement or Charge Indicator Display (for Split System)	REQ	REQ	REQ
Central Forced Air Handler:			
Cooling Airflow and Watt Draw	REQ	REQ	REQ
Central Fan Integrated Ventilation System Watt Draw	REQ	REQ	REQ
DUCTS			
Duct Sealing	REQ	REQ	REQ
Duct Insulation	R-8	R-8	R-8
WATER HEATING			
See Table C for minimum requirements			
Water heating system shall meet §151(f)8 or §151(b)1 for all packages (C, D, and E)			

LEGEND: NR = Not Required, NA = Not Allowed, REQ = Required, MIN = Shall meet minimum

Footnote requirements to Component Packages tables for climate zones 7, 10, 14, and 15:

1. The R-values shown for ceilings, wood-frame walls and raised floors 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. A supplemental heating unit may be installed in a space served directly or indirectly by a primary heating system, provided 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.

**TABLE B: SPACE-HEATING EQUIPMENT
MINIMUM EFFICIENCY REQUIRMENTS**

MINIMUM HEATING EFFICIENCY FOR CENTRAL FURNACES			
Type	Capacity	AFUE	
Central Furnace	< 225,000 Btu/hr	78%	
Central Furnace	≥ 225,000 Btu/hr	Rated according to thermal efficiency	
MINIMUM HEATING EFFICIENCY FOR BOILERS			
Type	Capacity	AFUE	Combustion Efficiency
Gas Steam Boilers (Single Phase)	< 300,000 Btu/hr	75%	NA
Gas Packaged Boilers	≥ 300,000 Btu/hr	NA	80%
Other Boilers (Single Phase)	< 300,000 Btu/hr	80%	NA
Oil Package Builders	≥ 300,000 Btu/hr	NA	83%
MINIMUM HEATING EFFICIENCY FOR NON-DUCTED, NON-CENTRAL GAS FIRED HEATING EQUIPMENT			
Type	Capacity	AFUE	
Wall Furnace (fan type)	≤ 42,000 Btu/hr	73%	
	> 42,000 Btu/hr	74%	
Wall Furnace (gravity type)	≤ 10,000 Btu/hr	59%	
	> 10,000 Btu/hr and ≤ 12,000 Btu/hr	60%	
	> 12,000 Btu/hr and ≤ 15,000 Btu/hr	61%	
	> 15,000 Btu/hr and ≤ 19,000 Btu/hr	62%	
	> 19,000 Btu/hr and ≤ 27,000 Btu/hr	63%	
	> 27,000 Btu/hr and ≤ 46,000 Btu/hr	64%	
	> 46,000 Btu/hr	65%	
Floor Furnace	≤ 37,000 Btu/hr	65%	
	> 37,000 Btu/hr	56%	
Room Heater	≤ 18,000 Btu/hr	57%	
	> 18,000 Btu/hr and ≤ 20,000 Btu/hr	58%	
	> 20,000 Btu/hr and ≤ 27,000 Btu/hr	63%	
	> 27,000 Btu/hr and ≤ 46,000 Btu/hr	64%	
	> 46,000 Btu/hr	65%	
MINIMUM HEATING EFFICIENCY FOR HEAT PUMPS			
Equipment Type	Configuration / Size	Minimum Efficiency	
Room Heat Pumps	Any	Cooling Standard Only	
Packaged Terminal Heat Pumps	Any	1.3 + [0.16(10.0 – 0.00016 x Cooling Capacity)] COP	
Single Phase Air Source Heat Pumps	< 65,000 Btu/hr Cooling Capacity (Packaged or Split)	7.7 HSPF	
	Through-the-wall < 65,000 Btu/hr Cooling Capacity (Packaged)	7.0 HSPF	
	Through-the-wall < 65,000 Btu/hr Cooling Capacity (Split)	7.1 HSPF	
	Small duct high velocity < 65,000 Btu/hr Cooling Capacity	7.7 HSPF	
Three-Phase Air Source Heat Pumps	< 65,000 Btu/hr (Packaged or Split)	7.7 HSPF	
Water-Source Heat Pumps	< 135,000 Btu/hr	4.2 COP	
	≥ 135,000 Btu/hr but < 240,000 Btu/hr	2.9 COP	

**TABLE C: SPACE- COOLING EQUIPMENT
MINIMUM EFFICIENCY REQUIREMENTS**

MINIMUM COOLING EFFICIENCY FOR CENTRAL AIR CONDITIONERS AND HEAT PUMPS		
Type	Output Capacity	SEER
Central Air Conditioners (Split or Single Package)	< 65,000 Btu/hr	13.0
Central Air Source Heat Pump (Split or Single Package)	< 65,000 Btu/hr	13.0
MINIMUM COOLING EFFICIENCY FOR LARGER CENTRAL AIR CONDITIONERS AND HEAT PUMPS		
Type	Size Category	EER
Central Air Conditioners	≥ 65,000 Btu/hr and < 135,000 Btu/hr	8.9
Central Air Source Heat Pumps	≥ 65,000 Btu/hr and < 135,000 Btu/hr	8.9
Central Water Source Heat Pumps	< 17,000 Btu/hr	11.2
Central Air Source Heat Pump (Split or Single Package)	≥ 17,000 Btu/hr and < 135,000 Btu/hr	12.0
MINIMUM COOLING EFFICIENCY FOR NON-CENTRAL SPACE COOLING EQUIPMENT		
Type	Size Category (input)	EER
Room Air Conditioners, with Louvered Sides	< 6,000 Btu/hr	9.7
	≥ 6,000 Btu/hr and < 8,000 Btu/hr	9.7
	≥ 8,000 Btu/hr and < 14,000 Btu/hr	9.8
	≥ 14,000 Btu/hr and < 20,000 Btu/hr	9.7
	≥ 20,000 Btu/hr	8.5
Room Air Conditioners, without Louvered Sides	< 6,000 Btu/hr	9.0
	≥ 6,000 Btu/hr and < 8,000 Btu/hr	9.0
	≥ 8,000 Btu/hr and < 20,000 Btu/hr	8.5
	≥ 20,000 Btu/hr	8.5
Room Air Conditioner Heat Pumps with Louvered Sides	< 20,000 Btu/hr	9.0
	≥ 20,000 Btu/hr	8.5
Room Air Conditioner Heat Pumps without Louvered Sides	< 14,000 Btu/hr	8.5
	≥ 14,000 Btu/hr	8.0
Casement-Only Room Air Conditioner	All Capacities	8.7
Casement-Slider Room Air Conditioner	All Capacities	9.5
Package Terminal Air Conditioners (PTAC) and Package Terminal Heat Pumps (PTHP)	≤ 7,000 Btu/hr	8.88
	> 7,000 Btu/hr and < 15,000 Btu/hr	10.0 – (0.00016 x Cooling Capacity)
	≥ 15,000 Btu/hr	7.6

TABLE D: WATER HEATING MINIMUM REQUIREMENTS

MINIMUM ENERGY FACTOR – SMALL WATER HEATERS		
Type	Size	Energy Factor (EF)
Gas Storage	≤ 75,000 Btu/hr	0.67 – (0.0019* Tank Volume)
Gas Instantaneous	≤ 200,000 Btu/hr	0.62 – (0.0019* Tank Volume)
Oil Storage	≤ 105,000 Btu/hr	0.59 – (0.0019* Tank Volume)
Oil Instantaneous	≤ 210,000 Btu/hr	0.59 – (0.0019* Tank Volume)
Electric Storage (exc. table top)	≤ 12 KW	0.97 – (0.0019* Tank Volume)
Electric Table Top	≤ 12 KW	0.93 – (0.0019* Tank Volume)
Electric Instantaneous (exc. table top)	≤ 12 KW	0.93 – (0.0019* Tank Volume)
Heat Pump Water Heater	≤ 24 Amps	0.97 – (0.0019* Tank Volume)
PRE-APPROVED PRESCRIPTIVE WATER HEATING SYSTEMS FOR SINGLE DWELLING UNITS		
Single gas or propane storage type water heater with an input capacity ≤ 75,000 Btu/hr and no recirculation pumps.* Exterior tank insulation of minimum R-12 tank wrap is mandatory for water heaters with the minimum energy factor (EF) and is not required for water heaters that exceed the minimum EF.		
Single gas or propane instantaneous water heater with an input capacity ≤ 200,000 Btu/hr and no recirculation pumps or storage tank.*		
Multiple instantaneous gas or propane with no pilot light and an energy factor of 0.85 or greater.*		
Heat pump water heater, ≤ 50 gal, ≥ 2.5 EF with a solar system contributing ≥ 25% of the total water heating requirements.*		
Two 50 gallon or less storage gas or propane fired units each with energy factor of 0.67 or greater and pipe insulation.*		
Storage gas, ≤ 50 gal, ≥ 0.59 EF, with Parallel Piping.*		
Storage gas, ≤ 50 gal, ≥ 0.62 EF, with Demand Recirculation.*		
Storage gas, ≤ 50 gal, ≥ 0.58 EF, time & temperature recirculation, and a solar system contributing ≥ 25% of total water heating energy.*		
Electric, ≤ 50 gal, ≥ 0.94 EF, pipe insulation and solar with ≥ 60% solar fraction. Allowed only in areas where natural gas is not available.*		
Water heater heat pump, ≤ 50 gal, ≥ 2.5 EF, and pipe insulation. Allowed only in areas where natural gas is not available.*		
Package C ONLY: Storage electric-resistance water heating located within the building envelope, ≤ 50 gal, with standard or point of use distribution (non-recirculating), and with a solar system contributing ≥ 25% of the annual water heating requirements.*		
* All hot water pipes from the heating source to the kitchen fixtures shall be thermally insulated as specified by Section 150(j)2.		
ACCEPTED PRESCRIPTIVE DISTRIBUTION SYSTEMS WITHIN A DWELLING UNIT		
Distribution Systems	Description	
Standard (STD)	Standard system without any pumps for distributing hot water. The first 5 ft. of pipes from the storage tank are insulated for both hot and cold water. Pipes from the water heater to the kitchen must be insulated per §150(j).	
Parallel Piping (PP)	Individual pipes radiate from a manifold near the water heater and hot water fixtures, except laundry.	
Recirculation with Manual Demand Control (RDmc)	Recirculation system that uses brief pump operation to recirculate hot water to fixtures when a demand for hot water is initiated with push button control activation. Pipe insulation is required per §150(j).	

COOL ROOFS:

Roofing products may need to comply with cool roof requirements based on the climate zone, roof pitch, and product weight. Products required to comply must be tested and labeled by the Cool Roof Rating Council (CRRC). Proposed cool roof products must be listed in the CRRC's Rated Product Directory (<http://www.coolroofs.org>) and tested for solar reflectance and thermal emittance.

Roofing products must be labeled by the manufacturer according to CRRC procedures. Below is a sample-approved CRRC product label:

		Initial	Weathered
	Solar Reflectance	0.00	Pending
	Thermal Emittance	0.00	Pending
	Rated Product ID Number	-----	
	Licensed Seller ID Number	-----	
	Classification	Production Line	
<small>Cool Roof Rating Council ratings are determined for a fixed set of conditions, and may not be appropriate for determining seasonal energy performance. The actual effect of solar reflectance and thermal emittance on building performance may vary.</small>			
<small>Manufacturer of product stipulates that these ratings were determined in accordance with the applicable Cool Roof Rating Council procedures.</small>			

Compliance must be accomplished by one of the two alternatives below:

Aged Solar Reflectance and Thermal Emittance

Proposed roofing products must meet the minimum aged solar reflectance and thermal emittance values per the Prescriptive Component Packages tables. The values must be listed in the CRRC's Rated Product Directory.

In some cases, the initial solar reflectance value may be listed in the CRRC Rated Product Directory and the aged value is not available. Use the equation below to calculate the aged solar reflectance for use on the CF-1R (ρ_{initial} = Initial Reflectance listed in the CRRC Rated Product Directory).

$$\text{AgedReflectance}_{\text{calculated}} = (0.2 + 0.7[\rho_{\text{initial}} - 0.2])$$

Solar Reflective Index (SRI) Value

Compliance can be shown by meeting a minimum SRI in lieu of the aged solar reflectance and thermal emittance requirements. The SRI alternative may be useful when a product exceeds the requirement for either the aged solar reflectance or the thermal emittance, but does not meet both requirements. The calculated SRI value may be sufficient to comply with the SRI requirement. If this alternative is used, the Solar Reflectance Index Calculation Worksheet provided by the California Energy Commission must be submitted. The SRI calculator is available online at: http://www.energy.ca.gov/title24/2008standards/sri_calculator/.

INDOOR AIR QUALITY AND MECHANICAL VENTILATION:

All low-rise residential buildings are required to have a whole-building ventilation system (operable windows are not a permissible method) and satisfy additional requirements to achieve acceptable indoor air quality (IAQ) to comply with the requirements of ASHRAE Standard 62.2-2007 as adopted by the California Energy Commission.

Additional mechanical ventilation and IAQ design requirements include but are not limited to:

1. Kitchens and bathrooms shall have local exhaust systems vented to the outdoors.
2. Ventilation air shall come from out of doors and shall not be transferred from adjacent dwelling units, garages, or crawlspaces.
3. Ventilation system controls shall be labeled, and the home owner shall be provided with instructions on how to operate the system.
4. Combustion appliances shall be properly vented, and air systems shall be designed to prevent back drafting.
5. Mechanical systems including heating and air conditioning systems that supply air to habitable spaces shall have MERV 6 filters or better.
6. Air inlets (not exhaust) shall be located away from know contaminants.
7. Air moving equipment used to meet either the whole-building ventilation requirement or the local ventilation exhaust requirement shall be rated in terms of airflow and sound.

Calculation of the required whole-building ventilation airflow rate and selection of the whole-building ventilation system type can be provided at the time of installation for prescriptive package compliance.

The builder/installer must complete and sign an Installation Certificate (CF-6R-MECH-05) that identifies the installed mechanical ventilation and indoor air quality features.

HERS REGISTRATION:

Residential buildings that require HERS verification for compliance must comply with a new California Energy Commission mandated documentation procedure called registration. Beginning January 1, 2010, registration will be required for tracts using multiple orientation compliance. Effective **October 1, 2010**, registration will be required for all low-rise residential buildings requiring HERS verification.

When registration is required, persons responsible for completing and submitting compliance documents (CF-1R, CF-6R, CF-4R, etc.) are required to certify and submit the forms electronically to a HERS provider data registry for retention. The registry shall assign a registration number to the documents, provided the documents are completed correctly and a certification/signature is provided by the responsible person. The registered documents will be retained by the HERS provider data registry. Copies of the unique registered documents will be made available via secure internet website access to authorized users of the HERS provider data registry for submittals to the County of San Diego, Building Division, and for any other applicable purposes.

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