RESIDENTIAL WATER HEATER ALTERATION OR REPLACEMENT REQUIREMENTS

Community Development
701 Laurel St., Menlo Park, CA 94025
tel 650-330-6704

CITY OF MENLO PARK

Federal energy factory requirements		
Product class	**Rated storage volume**	**Energy factor**
Gas-fired water heater	≥ 20 gal and ≤ 55 gal	0.675 – (0.0015*Vs)
	> 55 gal and ≤ 100 gal	0.8012 – (0.00078*Vs)
Oil-fired water heater	≤ 50 gal	0.68 – (0.0019*Vs)
Electric water heater	≥ 20 gal and ≤ 55 gal	0.960 – (0.0003*Vs)
	> 55 gal and ≤ 120 gal	2.057 – (0.00113*Vs)
Tabletop water heater	≥ 20 gal and ≤ 100 gal	0.93 – (0.00132*Vs)
Instantaneous gas-fired water heater	< 2 gal	0.82 – (0.0019*Vs)
Grid-enabled water heaters	> 75 gal	1.061 – (0.00168*Vs)

Storage water heating equipment that have rated storage volumes of 19 gallons or less or rated storage volumes larger than 101 gallons, the products not specified above and commercial water heaters are regulated by the California Appliance Efficiency Regulations. Energy factor is not applicable for this equipment, but rather minimums are specified for thermal efficiency and standby loss.

1. Water heaters shall be installed 18” above garage floor.
2. Water heater in garage shall be installed behind protective barriers, be elevated or located out of the normal path of vehicles.
3. Access from the outside only –appliances shall be installed at floor level, providing the required combustion air is taken from the exterior of the garage.
4. Seismic anchorage of water heater shall include anchors or straps at points within the upper and lower one-third of its vertical dimension, the lower anchor/strap located to maintain a minimum distance of 4 inches above the controls.
5. All water heaters shall have a pressure relief valve with drain to outside of building.
6. Minimum 24-inch wide door to water heater compartment is required.

Pipe insulation thickness requirement

Fluid temperature range (°F)	**Conductivity range (in Btu-inch per hour per square foot per °F)**	**Insulation mean rating temperature (°F)**	**Nominal pipe diameter (inches)**				
			< 1	1 to <1.5	1.5 to <4	4 to <8	8+
			Insulation thickness required (inches)				
Above 350	0.32-0.34	250	4.5	5	5	5	5
251-350	0.29-0.32	200	3	4	4.5	4.5	4.5
201-250	0.27-0.30	150	2.5	2.5	2.5	3	3
141-200	0.25-0.29	125	1.5	1.5	2	2	2
105-140	0.22-0.28	100	1	1.5	1.5	1.5	1.5

Where insulation is required as described above, 1 inch of insulation is typically required. This requirement applies to domestic water pipe (above 105°F) when the pipe diameter is 1 inch or smaller, the water temperature is between 105°F and 140°F, and the insulation conductivity between 0.22 and 0.28 BTU-in/hrft2-°F (typical of cellular foam pipe insulation material). One and one-half inch insulation is required on pipes greater than 1 inch.

CALIFORNIA ENERGY COMMISSION | EFFICIENCY DIVISION

Water Heater Efficiency Guide

These tables list the minimum uniform energy factors required by federal regulations for some of the most common types and sizes of water heaters.

Consumer Gas-Fired Instantaneous (> 50,000 Btu/h, ≤ 200,000 Btu/h) - Minimum UEF*

Volume (gallons)	Max Rating 0 ≤ GPM < 1.7	Max Rating 1.7 ≤ GPM < 2.8	Max Rating 2.8 ≤ GPM < 4.0	Max Rating GPM ≥ 4.0
≤ 2	0.80	0.81	0.81	0.81

Consumer Gas-Fired Storage (≤ 75,000 Btu/h) - Minimum UEF*

Volume (gallons)	0 ≤ FHR < 18	18 ≤ FHR < 51	51 ≤ FHR < 75	FHR ≥ 75
30	0.29	0.54	0.60	0.65
40	0.27	0.52	0.58	0.64
50	0.25	0.50	0.56	0.63
55	0.24	0.49	0.55	0.62
60	0.61	0.74	0.77	0.79
75	0.60	0.73	0.76	0.78
80	0.60	0.73	0.76	0.78

Residential-Duty Commercial Gas-Fired Storage (> 75,000 Btu/h, ≤ 105,000 Btu/h) - Minimum UEF†

Volume (gallons)	0 ≤ FHR < 18	18 ≤ FHR < 51	51 ≤ FHR < 75	FHR ≥ 75
50	0.22	0.48	0.55	0.61
60	0.21	0.46	0.53	0.61
75	0.2	0.45	0.52	0.59
80	0.2	0.44	0.51	0.59

Consumer Electric Instantaneous (≤ 12 kW) - Minimum UEF*

Volume (gallons)	Max Rating 0 ≤ GPM < 1.7	Max Rating 1.7 ≤ GPM < 2.8	Max Rating 2.8 ≤ GPM < 4.0	Max Rating GPM ≥ 4.0
≤ 2	0.91	0.91	0.91	0.92

Residential-Duty Commercial Electric Instantaneous (> 12 kW, ≤ 58.6 kW) - Minimum UEF†

Volume (gallons)	Max Rating 0 ≤ GPM < 1.7	Max Rating 1.7 ≤ GPM < 2.8	Max Rating 2.8 ≤ GPM < 4.0	Max Rating GPM ≥ 4.0
≤ 2	0.80	0.80	0.80	0.80

Btu/h
British thermal units per hour

kW
Kilowatt

GPM
Gallons Per Minute

FHR
First Hour Rating

UEF
Uniform Energy Factor

Consumer Electric Storage - Minimum UEF*

Volume (gallons)	0 ≤ FHR < 18	18 ≤ FHR < 51	51 ≤ FHR < 75	FHR ≥ 75
30	0.86	0.92	0.92	0.93
40	0.85	0.91	0.92	0.93
50	0.84	0.91	0.92	0.93
55	0.84	0.91	0.92	0.93
60	1.86	1.98	2.05	2.18
75	1.84	1.96	2.03	2.16
80	1.84	1.96	2.03	2.15

Tabletop - Minimum UEF*

Volume (gallons)	Max Rating 0 ≤ GPM < 1.7	Max Rating 1.7 ≤ GPM < 2.8	Max Rating 2.8 ≤ GPM < 4.0	Max Rating GPM ≥ 4.0
30	0.46	0.83	0.89	0.94
40	0.40	0.79	0.87	0.92

*Values from Title 20, §1605.1 Table F-2
†Values from Title 20, §1605.1 Table F-5

Can't find your water heater type or volume?
Contact the Energy Standards Hotline at:
(800) 772-3300 (inside California)
(916) 654-5106 (outside California)
title24@energy.ca.gov

CERTIFICATE OF COMPLIANCE	CF1R-ALT-05-E
Prescriptive Residential Alterations That Do Not Require HERS Field Verification	(Page 7 of 8)
Project Name: Page 7 of 8	Date Prepared:

H. Water Heating Systems (Section 150.2(b)1G)

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Dwelling Unit Name	Water Heating System Identification or Name	Water Heating System Location or Area Served	Water Heating System Type	Water Heater Type	# of Water Heaters in System	Water Heater Storage Volume (gal)	Fuel Type	Rated Input Type	Rated Input Value	Heating Efficiency Type	Heating Efficiency Value	Standby Loss (%)	Exterior Insulation R-Value	Back-Up Solar Savings Fraction

CERTIFICATE OF COMPLIANCE	CF1R-ALT-05-E
Prescriptive Residential Alterations That Do Not Require HERS Field Verification	(Page 8 of 8)

Project Name:	Page 8 of 8	Date Prepared:

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

1. I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name:	Documentation Author Signature:
Company:	Signature Date:
Address:	CEA/ HERS Certification Identification (if applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. That the energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a registered copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a registered copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:	Responsible Designer Signature:
Company :	Date Signed:
Address:	License:
City/State/Zip:	Phone:

For assistance or questions regarding the Energy Standards, contact the Energy Hotline at: 1-800-772-3300.