

Quick Reference Guide for Gas Water Heaters

This guide is intended to serve as a quick reference for building inspectors and contractors. Systems installed per these requirements will comply with the pertinent sections of the 2013 Building Energy Efficiency Standards (Title 24, Part 6 of the California Building Standards Code).

System	Minimum Required Efficiency ¹											
	Efficiency Formula ^{2,3}	30 Gal	35 Gal	40 Gal	45 Gal	50 Gal	55 Gal	60 Gal	65 Gal	70 Gal	75 Gal	80 Gal
Manufactured Before April 16, 2015												
Storage Gas water Heater (≤ 55 gallons & ≤ 75,000 Btu Input), Efficiency Expressed as Energy Factor (EF)	0.67 - (0.0019 * V)	0.613	0.604	0.594	0.585	0.575	0.565	N/A	N/A	N/A	N/A	N/A
Storage Gas water Heater (> 55 gallons & ≤ 75,000 Btu Input) Efficiency Expressed as Energy Factor (EF)	0.67 - (0.0019 * V)	N/A	N/A	N/A	N/A	N/A	N/A	0.556	0.547	0.537	0.528	0.518
Storage Gas water Heater (> 75,000 Btu Input) Efficiency Expressed as Thermal Efficiency (TE)	Must Use Performance Approach to Compliance											
Tankless Gas (≤ 200 kBtu input) Efficiency Expressed as Energy Factor (EF)	0.62											
Manufactured After April 16, 2015												
Storage Gas water Heater (≤ 55 gallons & ≤ 75,000 Btu Input) Efficiency Expressed as Energy Factor (EF)	0.675 - (0.0015 * V)	0.63	0.623	0.615	0.608	0.6	0.593	N/A	N/A	N/A	N/A	N/A
Storage Gas water Heater (> 55 gallons & ≤ 75,000 Btu Input) Efficiency Expressed as Energy Factor (EF)	0.8012 - (0.00078 * V)	N/A	N/A	N/A	N/A	N/A	N/A	0.754	0.751	0.747	0.743	0.739
Storage Gas water Heater (> 75,000 Btu Input) Efficiency Expressed as Thermal Efficiency (TE)	Must Use Performance Approach to Compliance											
Tankless Gas (≤ 200 kBtu input) Efficiency Expressed as Energy Factor (EF)	0.82											

Compliance Approach	How to Verify Efficiency
Prescriptive	Verify manufacture date to determine minimum required efficiency. Installed unit must meet or exceed this requirement. Manufacture date and efficiency are typically listed on the equipment label. If the information is not listed on the label, BayREN suggests that the installing contractor provide the inspector proof that the water heater meets the minimum efficiencies either through the CEC website or AHRI database.
Performance	Check the CF1R to determine minimum required efficiency. Manufacture Date and efficiency are typically listed on the equipment label. If the information is not listed on the label, BayREN suggests that the installing contractor provide the inspector proof that the water heater meets the minimum efficiencies either through the CEC website or AHRI database.

¹ Projects demonstrating compliance using the performance approach may require a higher efficiency than the minimums stated here. When this occurs, the efficiency listed on the CF1R-PRF-01 is the required efficiency.

² Appliance Efficiency Regulations are governed by California Building Code Title 20. Efficiencies listed above have been adapted from the 2014 Appliance Efficiency Regulations §1605.1(f), Table F-3.

³ For water heater systems that serve individual dwelling units, the standard design (Package A) is a 50 gallon gas storage water heater with an Energy Factor equal to the federal minimum standard, per the 2013 Residential Compliance Manual, §8.3.1.

System	Mandatory Pipe Insulation Requirements ⁴				
Water Heater Attributes	All Hot water pipes from source to kitchen fixtures	All hot water pipes ≥ 3/4" diameter	Hot water pipe buried below grade (waterproof non-crushable casing required)	Hot and cold water pipes insulated for first 5ft from water heater (conditioned or unconditioned space)	Entire hot water length insulated, all sections, buried pipe or exposed pipe
Standards Section	§150.0(j)(2)(A)	§150.0(j)(2)(A)	§150.0(j)(2)(A)(B)	§150.0(j)(2)(A)	§150.0(j)(2)(A)
Pipe Diameter ≤ 1"	Insulation Thickness				
Non-recirculating distribution system	1"	1"	1"	1"	N/A
Recirculating distribution system	1"	1"	1"	1"	1"
Pipe Diameter > 1"	Insulation Thickness				
Non-recirculating distribution system	1.5"	1.5"	1.5"	1.5"	N/A
Recirculating distribution system	1.5"	1.5"	1.5"	1.5"	1.5"

Standards Section	Mandatory Plumbing Requirements for New Construction and Additions with New Gas Storage Water Heater (to accommodate future installation of tankless water heater)
§150.0(n)(1)(A)	1. A 120V electric receptacle that is within 3 feet from the water heater and accessible to the water heater with no obstructions, and
§150.0(n)(1)(B)	2. A Category III or IV vent, or a Type B vent with straight pipe between the outside termination and the space where the water heater is installed, and
§150.0(n)(1)(C)	3. A condensate drain that is no more than 2 inches higher than the base of the installed water heater, and allows natural draining without pump assistance, and
§150.0(n)(1)(D)	4. A gas supply line with a capacity of at least 200,000 Btu/hr.

Procedure(s)	HERS Verified Measure Credits ⁵
RA3.6.3	1. Verified Pipe Insulation Credit (PIC-H)
RA3.6.4	2. Verified Parallel Piping (PP-H)
RA3.6.5	3. Verified Compact Hot Water Distribution System (CHWDS-H)
RA3.6.6	4. Verified Point of USE (POU-H)
RA3.6.7	5. Demand Recirculation: Manual Control (RDRmc-H)
RA3.6.8	6. Demand Recirculation: Sensor Control (RDRsc-H)

⁴ Insulation thickness requirements can be found in the energy code §120.3, Table 120.3 A.

⁵ For projects claiming credit for HERS Verified Measures listed above, the credits will be listed on the CF1R-PRF-01. For those measures, the building inspector should confirm that all appropriate information and signatures are contained in the CF2R/3R-PLB-22H. All other water heater requirements must still be met.