

**(Effective until July 1, 2020)**

**WAC 51-11C-40402 Section C404.2—Service water-heating equipment performance efficiency.**

**C404.2 Service water-heating equipment performance efficiency.** Water-heating equipment and hot water storage tanks shall meet the requirements of Table C404.2. The efficiency shall be verified through certification and *listed* under an *approved* certification program, or if no certification program exists, the equipment efficiency ratings shall be supported by data furnished by the manufacturer. Water-heating equipment also intended to be used to provide space heating shall meet the applicable provisions of Table C404.2.

**C404.2.1 High input-rated service water heating systems.** Gas-fired water-heating equipment installed in new buildings shall be in compliance with this section. Where a singular piece of water-heating equipment serves the entire building and the input rating of the equipment is 1,000,000 Btu/h (293 kW) or greater, such equipment shall have a thermal efficiency,  $E_t$ , of not less than 90 percent. Where multiple pieces of water-heating equipment serve the building and the combined input rating of the water-heating equipment is 1,000,000 Btu/h (293 kW) or greater, the combined input-capacity-weighted-average thermal efficiency,  $E_t$ , shall not be less than 90 percent.

EXCEPTIONS:

1. Where 25 percent of the annual service water-heating requirement is provided by site-solar or site-recovered energy, the minimum thermal efficiency requirements of this section shall not apply.
2. The input rating of water heaters installed in individual dwelling units shall not be required to be included in the total input rating of service water-heating equipment for a building.
3. The input rating of water heaters with an input rating of not greater than 100,000 Btu/h (29.3 kW) shall not be required to be included in the total input rating of service water-heating equipment for a building.

[Statutory Authority: RCW 19.27A.025, 19.27A.160, and 19.27.074. WSR 16-03-072, § 51-11C-40402, filed 1/19/16, effective 7/1/16. Statutory Authority: RCW 19.27A.020, 19.27A.025 and chapters 19.27 and 34.05 RCW. WSR 13-04-056, § 51-11C-40402, filed 2/1/13, effective 7/1/13.]

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**C404.2.1 High input-rated service water heating systems for other than Group R-1 and R-2 occupancies.** In new buildings where the combined input rating of the water-heating equipment installed in a building is equal or greater than 1,000,000 Btu/h (293 kW), the combined input-capacity-weighted-average efficiency of water-heating equipment shall be no less than the following for each water heating fuel source:

1. Electric: A rated COP of not less than 2.0. For air-source heat pump equipment, the COP rating will be reported at the design

leaving heat pump water temperature with an entering air temperature of 60°F (15.6°C) or less.

2. Fossil Fuel: A rated  $E_t$  of not less than 90 percent as determined by the applicable test procedure in Table C404.2.

EXCEPTIONS:

1. Where not less than 25 percent of the annual service water-heating requirement is provided from any of the following sources:
  - 1.1. Renewable energy generated on-site that is not being used to satisfy another requirement of this code; or
  - 1.2. Site-recovered energy that is not being used to satisfy other requirements of this code.
2. Redundant equipment intended to only operate during equipment failure or periods of extended maintenance.
3. Electric resistance heated systems installed as part of an alteration where the water heating equipment is installed at the grade level in a building with a height of four stories or greater.
4. Hot water heat exchangers used to provide service water heating from a district utility (steam, heating hot water).
5. Water heaters provided as an integral part of equipment intended to only heat or boost the heat of water used by that equipment.
6. For electric heat systems, supplemental water heaters not meeting this criteria that function as auxiliary heating only when the outdoor temperature is below 32°F (0°C) or when a defrost cycle is required are not required to have a rated COP of 2.0. Such systems shall be sized and configured to lock out electric resistance or fossil fuel heating from operation when the outdoor temperature is above 32°F (0°C) unless the system is in defrost operation.

**C404.2.2 High input-rated service water heating system for Group R-1 and R-2 occupancies.** In new buildings with over 1,000,000 Btu/h installed service water heating capacity serving Group R-1 and R-2 occupancies, at least 25 percent of annual water heating energy shall be provided from any combination of the following water heating sources:

1. Renewable energy generated on-site that is not being used to satisfy other requirements of this code; or
2. Site-recovered energy that is not being used to satisfy other requirements of this code.

EXCEPTION:

- Compliance with this section is not required if the combined input-capacity-weighted average equipment rating for each service water heating fuel source type is not less than the following:
1. Electric Resistance: An electric resistance water heater with a rating of 105 percent of the rated efficiency of Table C404.2.
  2. Electric Heat Pump (10 C.F.R. Part 430): A heat pump water heater rated in accordance with 10 C.F.R. Part 430 with a rating of 105 percent of the rated efficiency of Table C404.2.
  3. Electric Heat Pump (not listed in accordance with 10 C.F.R. Part 430): A heat pump water heater not rated in accordance with 10 C.F.R. Part 430 shall have a COP of not less than 2.0. For air-source heat pump equipment the COP rating will be reported at the design leaving heat pump water temperature with an entering air temperature of 60°F (15.6°C) or less. Supplemental water heaters not meeting the above criteria that function as auxiliary heating only when the outdoor temperature is below 32°F (0°C) or when a defrost cycle is required are not required to have a rated COP of 2.0. Such systems shall be sized and configured to lock out electric resistance or fossil fuel heating from operation when the outdoor temperature is above 32°F (0°C) unless the system is in defrost operation.
  4. Fossil Fuels: A rated  $E_t$  of not less than 90 percent as determined by the applicable test procedures in Table C404.2.
  5. Hot water heat exchangers used to provide service water heating from a district utility (steam, heating hot water).

[Statutory Authority: RCW 19.27A.020, 19.27A.025, 19.27A.160 and chapter 19.27 RCW. WSR 19-24-040, § 51-11C-40402, filed 11/26/19, effective 7/1/20. Statutory Authority: RCW 19.27A.025, 19.27A.160, and 19.27.074. WSR 16-03-072, § 51-11C-40402, filed 1/19/16, effective 7/1/16. Statutory Authority: RCW 19.27A.020, 19.27A.025 and chapters 19.27 and 34.05 RCW. WSR 13-04-056, § 51-11C-40402, filed 2/1/13, effective 7/1/13.]