

High input service water-heating systems

IECC: C404.2.1

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2018 International Energy Conservation Code

Revise as follows:

C404.2.1 High input 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 ~~90-92~~ 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 be not less than 90 percent.

Exceptions:

1. Where not less than 25 percent of the annual *service water-heating* requirement is provided by *on-site renewable energy* 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.

Reason Statement: Section C404.2.1 addresses not just typical commercial service water heating loads like laundries; it also addresses larger boilers used for central heating in R-occupancies. Water heating is one of the largest loads in R-1 (hotels) and R-2 (multifamily) occupancies. It composes around 25-35% of the total building load in typical multifamily buildings. This makes this an important provision of the energy code. However, while federal minimums and boiler markets have advanced, this provision has not been updated. Therefore, the performance premium that this provision requires has eroded over time.

This proposal includes a modest increase in the efficiency requirement for C404.2.1 from 90% E_t to 92% E_t . This improvement can be met without making major technology shifts since achieving a 90% E_t already generally requires condensing technology. Of the 2782 boilers that meet the 1,000,000 Btu/h threshold, 852 meet the existing 90% requirement and 792 meet a requirement of 92% E_t , so market availability will be minimally impacted.

Savings for this proposal are significant. Using the high-rise multifamily model developed by Pacific Northwest National Lab's determination study of the 2015 IECC, savings from this proposal would range from 2.3%-4.0% whole-building energy savings depending on climate zone. While 2015 is not exactly the same as 2018, the water heating provisions are very similar so the savings should be reasonably representative of savings for 2018.

Cost Impact: The code change proposal will increase the cost of construction

This proposal could have a limited impact on cost. However, it only eliminates about 7% of the boilers that meet the existing requirement, so the impact should be minimal.

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