

Washington State Energy Code Development
Standard Energy Code Proposal Form

Log No. 099
Revised 8/12/21 8/19/21
8/26/21

Code being amended: Commercial Provisions Residential Provisions

Code Section # C404.14

Brief Description:

This proposal adds demand responsive control requirements for certain water heaters.

Proposed code change text: (Copy the existing text from the Integrated Draft, linked above, and then use underline for new text and ~~strikeout~~ for text to be deleted.)

Add new definitions as follow and renumber Section C404.14s:

DEMAND RESPONSE SIGNAL. A signal that indicates a price or a request to modify electricity consumption for a limited time period.

DEMAND RESPONSIVE CONTROL. A control capable of receiving and automatically responding to a demand *response* signal.

Add new section as follows:

C404.14 Demand Responsive Water Heating. All electric water heating systems with an integrated storage tank~~Electric storage water heaters with rated water storage volume between 40 and 120 gallons and a nameplate input rating equal to or less than 12kW~~ larger than 20 gallons shall be provided with demand *response-responsive* controls that comply with ANSI/CTA-2045-B Level 2 or another equivalent approved demand responsive control.

Exceptions:

1. Water heaters that provide a hot water delivery temperature of 180°F (82°C) or greater~~Health care facilities.~~
2. Water heaters that comply with Section IV, Part HLW or Section X of the ASME Boiler and Pressure Vessel Code
3. Water heaters that use 3-phase electric power
4. Storage water heaters with demand response controls that comply with ANSI/CTA-2045-A or ANSI/CTA-2045-B Level 1, that are also capable of initiating water heating to meet the temperature set point in response to a demand response signal.

~~4.~~

Add new reference standards:

Reference	Title	Section
American National Standards Institute (ANSI) 25 West 43 rd Street New York, NY 20036, United States 1-212-642-4900; www.ansi.org		

ANSI/CTA-2045-A

Modular Communications Interface for Energy Management

ANSI/CTA-2045-B

Modular Communications Interface for Energy Management

7.3.4.422

ASME

Two Park Avenue

New York, NY 10016-5990

(800) 843-2763; <https://www.asme.org>

ASME

BPVC

Boiler and Pressure Vessel Code

IV, Part HLW:

X

Purpose of revision:

This is based on conversations with discussions with representatives from AHRI, the Advanced Water Heating Initiative and NEEA. The intent is to bring DR requirements in WA as far forward as product availability will allow. The revision does the following:

- It includes editorial changes to align the definitions with the terminology adopted in the demand responsive thermostatic controls.
- CTA-2045-B (Section 22.1), specifies that references to the standard should specifically state ANSI/CTA-2045-B Level 2. “Level 2” has been added for accuracy, but does not change the intent.
- It aligns the subject equipment with WA state legislation (40-120 gallons) to limit the potential for confusion.
- It provides an exception from the requirement for water heaters that meet CTA-2045-A (which is now codified as CTA-2045-B Level 1) and are capable of the “load-up” function from CTA-2045-B Level 2, which is one of the most important functions that differentiate -A from -B. This allows the controls to turn the water heater on and return to its set point based on a demand response signal, making it more likely that the tank will be “loaded up” when there is a need for energy consumption or in advance of a “shed” command. This effectively tells the water heater to go to the top of its dead band.

Currently, Rheem models that comply with CTA-2045-A also have this functionality and models from AO Smith are expected this fall. The exception will bridge the gap between what is currently available on the market and the full adoption of -B by the market. As -B models become more widely available, the exception will not be necessary.

The CTA-2045-A reference has been retained because that is what is in the WA legislation and the product literature. So, while it is technically obsolete, it would make the code more difficult to use if we eliminated it entirely.

- Under advice from industry representatives, this version includes additional exceptions for water heaters that meet the ASME “heavy duty” standard, run on 3-phase power or deliver water at more than 180F. These water heaters effectively serve process loads, but some still fall below 120 gallons. They aren’t especially compatible with DR, so manufacturers are reasonably not implementing CTA-2045 for these models. These are not widely common in commercial buildings, so it is reasonable to exclude them.
- As there is now an exception for high-temp water heaters, there is no need for the health care exception since that captures the same application.

All questions must be answered to be considered complete. Incomplete proposals will not be accepted.

- It includes the additional reference standards required for these modifications and corrects the section reference for CTA-2045-B.

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