

**DOCKETED**

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*Comment Received From: A. O. Smith Corporation  
Submitted On: 3/9/2021  
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**A O Smith Corporation's Comments - Draft 2022 Energy Code  
Express Terms**

*Additional submitted attachment is included below.*



March 9, 2021

Commissioner J. Andrew McAllister, Ph.D.  
California Energy Commission  
Dockets Office, MS-4  
1516 Ninth Street  
Sacramento, CA 95814

**Re: A. O. Smith Corporation's Comments on the Draft 2022 Energy Code Express Terms;  
Docket: 19-BSTD-03**

Dear Commissioner McAllister:

A. O. Smith appreciates the opportunity to submit comments on the California Energy Commission (CEC) Draft 2022 Energy Code Express Terms. The pre-rulemaking draft Express Terms includes energy efficiency requirements applicable to newly constructed buildings and additions and alterations to existing buildings. Our comments to the draft Express Code update focuses heat pump water heaters (HPWH), and more specifically on the proposals on qualification requirements and testing provisions for central HPWH as shown in Joint Appendix (JA) 14. A. O. Smith previously commented during the pre-draft versions on the testing burdens representative by JA 14 for central HPWHs and continues to have significant concerns. A. O. Smith believes JA 14 represents a barrier to the central HPWH market and will cause unnecessary burdens on manufacturers. These barriers can be addressed while maintaining the integrity of the performance curves needed for the Title 24 modeling by adopting our suggested changes outlined below.

*About A.O. Smith*

A. O. Smith is a global leader in applying innovative technology and energy efficient solutions to products manufactured and marketed worldwide. Our company is one of the world's leading manufacturers of residential and commercial water heating and hydronic heating equipment, as well as a manufacturer of water treatment and air purification products. Along with its wholly owned subsidiary, Lochinvar LLC, A. O. Smith is the largest manufacturer and seller of residential and commercial water heating equipment, high efficiency residential and commercial boilers and pool heaters in North America.

### Comment Overview

A. O. Smith appreciates the extensive work the CEC has done to date on these important issues and we look forward to continued collaboration. Central HPWHs will play a vital role in two key California policy priorities – reducing the carbon footprint in multi-family buildings as the state transitions from installed gas-fired water heaters to electric and helping to manage the integration of increasing amounts of renewable energy given HPWHs unique ability to shift load and serve as thermal energy storage devices. It is imperative that the Title 24 (T24) software updates for the 2022 code not only include, but also encourage the use of central HPWHs in multifamily applications. Notwithstanding our support of central HPWH technology options for the California market, A. O. Smith has some concerns about the proposed qualification and testing requirements, which may have the unintended consequence of slowing market adoption by placing an overly burdensome testing regime on equipment manufacturers. A. O. Smith previously submitted comments in response to the pre-draft workshop and appreciates the introduction of alternative efficiency determination methods (AEDMs) into the latest JA 14 drafts as described in the express terms. A. O. Smith continues to have concerns and believes that the CEC has inadvertently placed overly restrictive barriers on the use of AEDMs, continuing to require more points than necessary for testing to ensure the performance curves for central HPWHs are valid.

### Comments to the Proposed Joint Appendix 14

The draft Express Terms includes a newly proposed JA 14, which addresses testing, simulation and design documentation requirements for central HPWH systems in multifamily and nonresidential buildings. A. O. Smith supports some limited testing underlying the development of performance curves that are necessary to model central HPWHs in the T24 software. However, the JA 14 rules as currently drafted represent a significant burden in the requisite testing and the very narrow application of AEDMs. If a manufacturer wanted to base the performance curve development on testing, it appears the CEC is proposing that each central HPWH model shall be tested at the following conditions:

- Inlet ambient air temperature: Maximum, minimum, and two midpoint temperatures of the manufacturer specified operating range.
- Inlet water temperature: Maximum, minimum, and two midpoint temperatures of the manufacturer specified operating range.
- Outlet water temperature: Maximum, midpoint, and minimum of outlet water (setpoint) temperatures of the manufacturer specified operating range.

As presented, the CEC's testing proposal requires 48 test points per model, which represents a significant amount of testing time and cost. The testing time for 12 test points per ambient will likely take several days when stabilization is taken into consideration. **In addition, many third-party laboratories do not have the capabilities to test central HPWHs without further modifications to their facilities.** A. O. Smith is not certain that the third-party testing industry

could accommodate the needs of water heating manufacturers trying to generate this data for their full range of model offerings by the 2022 compliance date that CEC is proposing. Lastly, we believe that this testing burden will also hamper development of new products as the cost of entering a new model into distribution will be significant.

While A. O. Smith understands the importance of ensuring the performance curves used in the CEC's database are grounded by testing and reflective of the model's performance, we believe JA 14 places an unnecessarily high testing burden on central HPWH manufacturers. In addition, the proposal lacks specificity around humidity, which can significantly impact the central HPWHs performance as well. A. O. Smith respectfully requests that an alternative be considered by CEC that reduces the testing burden in JA 14, but provides the same level of data quality and performance substantiation for the T24 performance curves.

As such, A. O. Smith continues to believe JA 14 should be revised as follows:

- Three Inlet ambient air temperature: ~~Maximum, minimum, and two midpoint temperatures of the manufacturer specified operating range.~~ the DOE Federal condition of 80.6 F, the minimum, and one in between specified by the manufacturer. The humidity at each of these ambient conditions should also be defined (e.g., higher at lower ambient).
- One Inlet water temperature: ~~Maximum, minimum, and two~~ at the midpoint temperatures of the manufacturer specified operating range.
- Outlet water temperature: Maximum, midpoint, and minimum of outlet water (setpoint) temperatures of the manufacturer specified operating range.

A. O. Smith's proposal represents 27 points total as compared to CEC's 48 in order to reduce burden on a per model basis. Our goal with this alternative proposal is to set the chamber conditions and to take all the different water temperature data for the specified ambient and humidity conditions within a single day. Further, A. O. Smith's proposal represents testing that can likely be done within a one-week period for each model and within existing laboratory facilities.

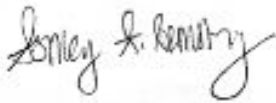
As far as the CEC's proposal to allow use of the AEDM, A. O. Smith believes the clarifications to the basic model definition represented in JA 14 are overly restrictive. These provisions were intended to govern the use cases for when an AEDM can be applied. However, they only allow the use of a simulation for one other capacity in the entire HPWH product line and require testing for the remainder as currently drafted. In order to further reduce burden in this nascent market, we suggest the CEC modify the AEDM provisions to allow the use of modeling to simulate the performance data for "similar" models, which should be defined as those that share the same compressor. This is a much broader application than the proposed provisions in JA 14. These suggested modifications provide the right balance of capturing differences in refrigeration system performance due to the change in compressor model, but also serve to reduce the burden where similar performance is expected and modeling can easily capture size increases. In addition, CEC is cross-referencing the requirements for AEDMs governed by the Federal regulations, which ensure simulated performance is within 5 percent of test

performance to help ensure the integrity of simulated data. The combination of these two alternative suggestions will significantly reduce the testing burden and cost for the central HPWH industry, but it will also allow CEC to have confidence in the performance data within the T24 modeling software.

Conclusion

A. O. Smith appreciates the opportunity to provide comments in the pre-rulemaking phase to draft Express Terms. We look forward to continued dialogue and collaboration with the CEC to reach the state's decarbonization goals and increase the market for HPWHs in new construction, single family residences. Please feel free to contact me if you have questions.

Respectfully submitted,

A handwritten signature in black ink that reads "Ashley A. Armstrong". The signature is written in a cursive style with a large, stylized initial 'A'.

Ashley A. Armstrong  
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