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AOS Comments on the Title 24 Final CASE Team Report Pertaining to Multi-Family All-Electric for Central HPWHs

Additional submitted attachment is included below.



December 23, 2020

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 Title 24 Final CASE Team Report Pertaining to Multi-Family All-Electric for Central Heat Pump Water Heaters

Docket: 19-BSTD-09

Dear Commissioner McAllister,

Introduction and Comment Overview

A. O. Smith appreciates the opportunity to submit comments on the 2022 proposals being considered pertaining to central heat pump water heaters (HPWHs) in multi-family applications. More specifically, the California Energy Commission (CEC) is considering a proposal from the final 2022 Codes and Standards Enforcement (CASE) Team, which suggests adding testing provisions for central HPWHs as shown in Joint Appendix (JA) 14. The CEC also presented these proposals as part of the 2022 Energy Code Pre-Rulemaking - Solar PV, Storage, and Heat Pump Baseline Workshop held on December 8, 2020 and is seeking feedback. Our comments are specific to the presentation titled “2022 Central Heat Pump Water Heater Updates” by Danny Tam, Mechanical Engineer at the CEC.

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 of its buildings as California transitions its large installed base of 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 its support of central HPWH technology options for the California market, A. O. Smith has some concerns about the testing requirements as presented in JA 14, which may have the unintended consequence of slowing market adoption by

placing an overly burdensome testing regime on equipment manufacturers. As further explained below, A. O. Smith offers an alternative proposal for the CEC's consideration and respectfully requests that the CEC consider the proposed changes to the testing requirements in JA 14.

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. The 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.

Comments to the Proposed Joint Appendix 14

The *CASE All Electric Multifamily Compliance Pathway* report includes a newly proposed JA 14, which addresses testing and design documentation requirements for central HPWH systems in multifamily and nonresidential buildings. A. O. Smith supports testing underlying the development of performance curves that are necessary to model central HPWHs in the T24 software. However, the JA14 rules as currently drafted represent a significant burden if the requisite testing is required for every model distributed in California. For example, 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. Minimum shall be equal to or lower than 40 °F.
- 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. Maximum shall be equal to or greater than 140 °F.

In total, the CEC's testing proposal as represented in JA14 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, A. O. Smith also believes 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, A. O.

Smith believes JA14 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 JA14, but provides the same level of data quality and performance substantiation for the T24 performance curves.

A. O. Smith believes Appendix JA14 should be revised as follows:

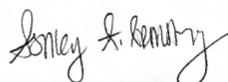
- Three Inlet ambient air temperatures: the DOE Federal condition of 80.6 F, the minimum, and one in between specified by manufacturer. The humidity at each of these ambient conditions should also be defined (e.g., higher at lower ambient).
- One Inlet water temperature at the midpoint temperature.
- Outlet water temperature: Maximum, midpoint, and minimum of outlet water (setpoint) temperatures of the manufacturer specified operating range. Maximum shall be equal to or greater than 140 °F. Same as CEC’s proposal in JA14.

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 was 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. Lastly, A. O. Smith does not believe it is necessary to test each model offering in order to confirm that the performance curve for each of the models is representative of tested performance. In order to further reduce burden in this nascent market, A. O. Smith suggests the CEC provide provisions that allow the use of modeling to simulate the performance data for “similar” models, which can be defined as those that share the same compressor. These provisions provide the right balance of capturing differences in refrigeration system performance due to the change in compressor model, but also serve to reduce burden where similar performance is expected and modeling can easily capture increases in size. 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 response to the T24 2022 code proposals for central HPWHs. Please feel free to contact me if you have questions and stands ready to work with the Commission moving forward.

Respectfully submitted,



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