

DOCKETED	
Docket Number:	24-BSTD-01
Project Title:	2025 Energy Code Rulemaking
TN #:	255324-6
Document Title:	Staff Supplement to 2025 CASE Report - Residential HVAC Performance
Description:	N/A
Filer:	Javier Perez
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	3/28/2024 4:36:52 PM
Docketed Date:	3/28/2024



***Staff Supplement to California Statewide Codes and Standards
Enhancement (CASE) Team Measure Proposal Residential HVAC
Performance***

Date: March 28, 2024

Pages: 5

Author: Bach Tsan/Stephen Becker

Description of Proposed Regulatory Changes

The measure change proposal submitted by California Statewide Codes and Standards Enhancement (CASE) team and titled “Residential HVAC Performance” proposes to make the following changes to the Standards:

1. Design (Sizing, Equipment Selection, and Ducts/Diffusers)
 - Require documentation of load calculations and system sizing; provide details on duct/diffuser design; minimum heating capacity—not including supplementary heating. Applies to all HVAC in all CZs, New Construction (NC); Not for multifamily.
 - Staff does not believe Part 6 is the correct place for the proposed changes to Sections 10-103(a)2, 10-103(b)3, 150.0(h)1, and 150.0(h)5 pertaining to documentation of load calculation, documentation of system sizing, and documentation of duct/diffuser design details. Staff will instead incorporate changes to compliance documents that will functionally accomplish the same goals of this measure.
 - Staff agrees with requirements for minimum heating capacity that does not include supplemental heating in Section 150.0(h)5 and have incorporated substantively similar changes into the proposed Express Terms.
 - For additions and alterations, require documentation of load calculations and system sizing, even for like-for-like replacements; provide details on duct/diffuser design; require use of average infiltration assumptions (or blower door test) and allow simplifying assumptions and block loads in some load calculations; minimum heating capacity—not including supplementary heating; and maximum equipment sizing limits (or ensure adequate airflow).

- Staff does not believe Part 6 is the correct place for the proposed changes to Sections 10-103(a)2, 10-103(b)3, 150.0(h)1, and 150.0(h)5 pertaining to documentation of load calculation, documentation of system sizing, and documentation of duct/diffuser design details. Staff will instead incorporate changes to compliance documents that will functionally accomplish the same goals of this measure.
- Staff agrees with the proposed changes to Sections 150.2(a)1 and 150.2(a)2, pertaining to minimum heating capacity limits, infiltration assumptions, block loads, and maximum equipment sizing for additions only. Staff has incorporated substantively similar changes into the proposed Express Terms.
- Staff does not agree with the proposed changes to Sections 150.2(b)1 and 150.2(b)2, pertaining to minimum heating capacity limits, infiltration assumptions, block loads, and maximum equipment sizing for alterations because the increased stringency and costs associated with these changes would likely lead to higher levels of noncompliance with the energy code.

2. Supplementary Heating

- Install and field verify controls that lock out supplementary heating above a certain outdoor temperature; impose strip heating capacity limits. Require HERS verification to certify heat pumps are capable of and configured to do lockout supplementary heating above a certain outdoor air temperature. Applies to heat pumps in single family except CZ 7 and 15. Not for small single family or multifamily homes.
 - Staff does not agree with the HERS related parts of the proposal because of concerns about the lack of communication with HERS providers by the CASE team. Additionally, CEC staff does not believe that supplementary heating lockout needs HERS verification because a combination of manufacturers instruction and installer training would achieve the same goals.

However, staff does agree with all other parts of the proposed changes to Section 150.0(h)9 and have

incorporated substantively similar changes into the proposed Express Terms.

3. Defrost

- Set defrost delay timer optimally. Requires manufacturers to provide simple instructions for how to configure the defrost timer of installed heat pumps. Requires HERS verification to certify that installed heat pumps' defrost timers have been set optimally. Applies to heat pumps in single family homes except homes in CZ 6 and 7, small single family homes in CZs 3,5 through 10, and 15, and Multifamily buildings except CZs 1, 6-10, 15-16.
 - Staff does not agree with the parts of the proposal related to instruction requirements. Staff is concerned that the CEC's lack of authority to force manufacturers to provide "simple instructions" will lead to low compliance, that "simple instructions" are typically not well developed, and that training would be required for manufacturers to write these instructions.

Additionally, staff does not agree with the parts of the proposal related to HERS verification. Staff is concerned about the lack of communication with HERS providers by the CASE team, and that the tasks to be performed by the HERS raters have not been well defined in the report. Staff will discuss with HERS raters to determine verification procedures that adds the extra layer of assurance and quality control while identifying difficulty of ensuring the installation meets the requirements.

However, staff does agree with all other parts of the proposed changes to Section 150.0(h)7 and have incorporated substantively similar changes into the proposed Express Terms.

4. Occupant Controlled Smart Thermostats (OCST) and Crankcase Heating (CCH)

- Install an Occupant Controlled Smart Thermostat, or an air conditioner or heat pump with a crankcase heater that is controlled base on compressor operation and temperature.
 - Staff does not agree with the proposed additions to Sections 150.1(c)7 pertaining to Occupant Controlled Smart

Thermostats and Crankcase Heating due to concerns about the lack of energy savings associated with OCSTs and concerns about the ability to verify that CCH requirements have been met.

5. Refrigerant Charge Verification

- Require documentation when refrigerant weigh-in method used and allow remote verification; expand the number of climate zones where charge verification is required for heat pumps and air conditioners; remove option to comply using fault indicator display device.
 - Staff does not agree with the proposed additions to RA3.2.3.1.5 and RA3.2.3.3 related to remote verification because of concerns about the ability to confirm compliance using remote verification.

However, staff does agree with all other parts of the proposed changes to Section 150.1(C)7, RA3.2.3.1.5, RA3.2.3.2, and RA3.4.2, and have incorporated substantively similar changes into the proposed Express Terms.

6. Variable Capacity Systems

- Modify fan efficacy test procedure; clarify definition of system airflow; compliance model revisions to account for distribution loss impacts of variable capacity systems.
 - Staff does not agree with the proposed changes to Section(s) 150.0(m)13B, 50.0(m)13D and in RA3.3 in the Express Terms and have instead proposed not to make changes to Section(s) 150.0(m)13B. Staff has concerns over increased stringency of the requirement to demonstrate control in every mode and with all zones.

However, staff does agree with other parts of the proposed changes to Section 150.1(m), regarding the incorporation of controls that vary fan speed with respect to number of zones calling and have incorporated substantively similar changes into the proposed Express Terms.

Staff Analysis and Conclusion

Staff has analyzed the submitted proposal and reached the following conclusions for the measures included in the Express Terms:

- Based on the evidence presented in the proposal, measures for design, supplemental heating, defrost and specific aspects of refrigerant charge verification, as proposed, are cost effective and the author has appropriately followed the Energy Commission's Life Cycle Cost methodology.
- Measure costs premiums presented in the proposal are reasonable and appropriate for the measure proposed.
- Measured energy savings presented in the proposal are appropriately modeled and appear credible.
- Measure environmental impacts presented in the proposal are reasonable and appropriate for the measure proposed.