

DOCKETED

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Statewide Utility Codes and Standards Team Comments on Residential Quality Insulation Installation (QII) and Heat Pump Capacities

Additional submitted attachment is included below.

Comments on Residential Heat Pump Capacities and Quality Insulation Installation in 2019 Title 24, Part 6 45-Day Language

California Statewide Utility Codes and Standards Team

February 20, 2018

1. Introduction

The California Statewide Utility Codes and Standards Team (Statewide CASE Team) appreciates the opportunity to participate in the rulemaking and the thoughtful feedback we have received from the California Energy Commission on the Codes and Standards Enhancement (CASE) proposals.

The CASE initiative presents recommendations to support the Energy Commission's efforts to update California's Building Energy Efficiency Standards (Title 24, Part 6) to include new requirements or to upgrade existing requirements for various technologies. The four California Investor Owned Utilities – Pacific Gas and Electric Company, San Diego Gas and Electric, Southern California Edison and SoCalGas® – and two publicly Owned Utilities – Los Angeles Department of Water and Power and Sacramento Municipal Utility District – sponsored this effort.

The Statewide CASE Team actively supports the Energy Commission in developing revisions to Title 24, Part 6 by developing code change proposals that will result in feasible, enforceable, and cost-effective enhancements to the building energy efficiency standards. In developing these proposals, the Statewide CASE Team conducts research and market surveys, holds stakeholder meetings, and evaluates the energy savings and cost-effectiveness of considered measures. The CASE Reports, which present pertinent information that supports the code change proposals, are posted within each measure topic page on title24stakeholders.com.

The Statewide CASE Team encourages the Energy Commission to consider the following changes to residential quality insulation installation (QII) and heat pump capacities.

Recommended revisions to the 45-Day Language are included in this document in **turquoise**. The Statewide CASE Team's recommended language **insertions are double underlined** and recommended language **deletions are double struck**.

1. Quality Insulation Installation (QII)

The Statewide CASE Team is concerned that the language stated in Section 150.2(a)1A regarding additions greater than 700 ft² meeting the prescriptive requirements in Section 150.1(c), which include QII, may cause a compliance and enforcement challenge. The proposed code language states:

Section 150.2(a)1A. Additions that are greater than 700 square feet shall meet the prescriptive requirements of Section 150.1(c), with the following modifications:

Section 150.1(c) also includes the QII requirements in section 150.1(c)1E listed below:

Section 150.1(c)1E. All buildings shall comply with the Quality Insulation Installation (QII) requirements shown in TABLE 150.1-A or B. When QII is required, insulation installation shall meet the criteria specified in Reference Appendix RA3.5.

Additions which consist of converting an existing unconditioned space to newly conditioned space may not be able to meet all the QII requirements referenced in RA3.5. These include potential difficulty air-sealing the envelope in areas of the existing structure that may be inaccessible, and insulating headers in areas where the header is existing.

1.1 Recommendation

It is recommended that the QII requirements allow these types of ‘newly conditioned’ spaces to be successful in a cost-effective way, through the addition of the following language to section 150.1(c)1A:

iv. Newly conditioned additions that consist of the conversion of existing spaces from unconditioned to conditioned space (e.g. garages, basements) are exempt from the following sections of RA3.5:

- a. *Window and door header requirements where existing wall sections are converted to exterior walls adjacent to conditioned space (Sections RA3.5.3.2.9, RA3.5.4.2.9, RA3.5.5.2.9, RA3.5.6.2.9, RA3.5.7.2.7, and RA3.5.8.2.7).*
- b. *Air sealing of inaccessible areas of existing wall sections, including wiring and plumbing penetrations not accessible to sealing. (Sections RA3.5.3.2a, RA3.5.4.2a, RA3.5.5.2a, and RA3.5.6.2a).*

2. Heat Pump Capacities

Many heat pumps have back-up electric resistance heating elements that are energized to provide additional capacity when the heat pump cannot meet its heating load. Heat supplied by electric resistance uses more than twice the energy normally used by a heat pump compressor. For buildings using the performance approach, the California Building Energy Code Compliance software for residential buildings (CBECC-Res) will model a specific size heat pump and during those times that the heat pump capacity is less than the load on the heat pump, the simulation program will model the additional energy consumed by the electric resistance heat strips. All things being equal, a heat pump that is sized to meet the full heating load under winter design conditions will use less energy than a smaller heat pump because it may only require electric resistance heat during defrost cycles. Since heat pumps with less capacity relative to the load use more energy, the 45-Day Language has proposed that when heat pumps are modelled in the performance approach, the installed heat pump capacity must be verified by a HERS rater to be equal to or greater than the capacity used in the compliance model. When the installed capacity is less than the modeled capacity, the applicant would have to re-run the simulation program to show their building still complies using the lower capacity heat pump.

The Statewide Codes & Standards team is concerned that the language stated in Section 150.1(b)2Bv regarding Heat Pump Rated Heating Capacity may cause a compliance challenge. The proposed code language states:

When performance compliance requires installation of a heat pump system that meets or exceeds specified heating capacity values at 47 degrees F and 17 degrees F, the installed system shall be field verified in accordance with the procedures specified in Reference Residential Appendix RA3.4.4.2.

Knowing what the heating capacity values are for heat pumps at 47 degrees F and 17 degrees F may be difficult to determine at the time the CF1R is completed. Heat pump capacities at 17 degrees F and 47

degrees F are not specified in the CEC Appliance Efficiency Directory (MAEDBS) and may not be known until the equipment is installed.

Often, the equipment make and model number is unknown at the design phase, thereby requiring energy consultants to use heating capacity values that may not be accurate or correct as a place-holder. If the place-holder heating capacity values are greater than the values of the installed equipment, it would cause the system to fail the HERS verification at the end of construction when the builder has very few options besides requiring a rerun of the CF1R with adjusted capacities. This is especially true in residential single family homes, where mechanical drawings with equipment schedules are typically not provided at permit.

2.1 Recommendation

We encourage the Energy Commission to develop default heating capacity values, or a calculation method to determine minimum 47 degrees F and 17 degrees F heat capacity values for heat pumps. This could be accomplished through the compliance software by providing an option to apply default values for heating capacities through an auto-sizing function to develop the capacities and report the default values on the Certificate of Compliance.

The Statewide CASE Team is also proposing to only require verification of capacity for heat pumps that incorporate electric resistance heating to reduce the use of electric resistance heating due to undersized equipment.

2.1.1 Proposed Edits to 45-Day Language

150.1(b)2B

*v. **Heat Pump Rated Heating Capacity.** When a heat pump with electric resistance supplemental heating is installed, the installed system shall be field verified in accordance with Reference Residential Appendix RA3.4.4.2. and the installed heat pump heating capacity shall be greater than or equal to the heat pump heating capacity values in the performance simulation as reported on the Certificate of Compliance.*

RA3.4.4.2

For performance compliance when a heat pump with electric resistance supplemental heating is installed, the installed heat pump equipment shall be verified according to the procedure specified in this section. The verification shall utilize certified rating data from the AHRI Directory of Certified Product Performance at <http://www.ahridirectory.org> or another directory of certified product performance ratings approved by the Energy Commission for determining compliance.

The procedure shall consist of visual verification of installation of the following system equipment components and confirmation that the installed equipment is rated to provide the required heating capacity:

- (a) The manufacturer name and the model number of the outdoor unit or package unit.*
- (b) The manufacturer name and the model number of the inside coil if applicable.*
- (c) The name of the product directory used to certify the system performance.*
- (d) The certification number of the installed system if certification numbers for listed products are published by the product directory.*
- (e) The rated heating capacity at 47 degrees F.*

(f) The rated heating capacity at 17 degrees F. If the 17 degrees F value is not available for the installed equipment, the rated heating capacity at 47 degrees F shall be verified only.

(g) To comply with Section 150.1(b)2Bv, the verified heat pump heating capacity at 47 degrees F and 17 degrees F shall be greater than or equal to the performance simulation heating capacity at 47 degrees F and 17 degrees F of the heat pump reported on the Certificate of Compliance.