Proposal Summary

2022 California Energy Code (Title 24, Part 6)

Compliance Requirements for Residential HVAC Fault Detection and Diagnostics

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Introduction

The document summarizes proposed revisions to the California Energy Code (Title 24, Part 6) that will be discussed during a utility-sponsored stakeholder meeting on October 10, 2019. The Statewide Utility Codes and Standards Enhancement (CASE) Team is seeking input and feedback. To provide your comments, email info@title24stakeholders.com by October 24, 2019.

Measure Description

The focus of the Residential Fault Detection and Diagnostics (FDD) measure is to provide credit for use of advanced technologies that detect when residential HVAC systems are installed and operated optimally. The Statewide CASE Team is proposing a compliance credit that will be granted for installation of FDD devices that can identify over time when an HVAC system's performance is not optimal (due to installation faults or faults that emerge over time) and alert the owners or service providers. Credit may be provided in a way similar to the refrigerant and airflow verification credit—Section 2.4 of the 2016 Title 24, Part 6 Residential ACM Reference Manual describes credit given to systems for which the charge is verified as correct by establishing a "compressor efficiency multiplier," which is used in calculations to degrade the efficiency of a compressor by a factor of 10 percent when charge is not verified as correct, but only by 4 percent when it is verified as correct. In this case, an efficiency multiplier may be used to provide credit for installation and proper configuration of an FDD device or FDD-enabled HVAC system. In this effort, the Statewide CASE Team is conducting field research to identify the appropriate efficiency multiplier for systems with and without an FDD device, and also providing performance-based specifications for manufacturer certification of FDD effectiveness and field verification of proper FDD installation.

Draft Code Language

The proposed changes to the Standards and Reference Appendices are provided below. Changes to the 2019 documents are marked with red underlining (new language) and ~~strikethroughs~~ (deletions).

RA3.4.5 RESIDENTIAL HVAC FDD VERIFICATION PROCEDURES

RA3.4.5.1Construction Inspection

(new requirements)

RA3.4.5.2Functional Testing

(new requirements)

JA6.4 RESIDENTIAL HVAC FDD CERTIFICATION SUBMITTAL REQUIREMENTS

(new requirements)

ACM 2.4.5.1 VERIFIED REFRIGERANT CHARGE OR FAULT INDICATOR DISPLAY

Proper refrigerant charge is necessary for electrically driven compressor air-conditioning systems to operate at full capacity and efficiency, and ongoing verification is needed to keep it operating at full capacity and efficiency. Software calculations set the compressor efficiency multiplier to ~~0.90 to account for the effect of improper refrigerant charge or 0.96 for proper charge.~~:

- 0.90 when there is no initial verification and no ongoing FDD; or
- 0.96 when there is initial verification but no ongoing FDD; or
- XXX when there is ongoing FDD but no initial verification; or
- XXX when there is both initial verification and ongoing FDD.

PROPOSED DESIGN

The software allows the user to indicate if systems will have diagnostically tested refrigerant charge or a field-verified fault indicator display (FID). This applies only to ducted split systems and packaged air conditioners and heat pumps.

STANDARD DESIGN

The standard design building is modeled with either diagnostically tested refrigerant charge or a field-verified FID if the building is in climate zone 2 or 8-15, and refrigerant charge verification is required by Section 150.1(c) and Table 150.1-A or 150.1-B for the proposed cooling system type.

Table 10: Summary of Space Conditioning Measures Requiring Verification

Measure	Description	Procedures
Verified Refrigerant Charge	Air-cooled air conditioners and air-source heat pumps must be tested diagnostically to verify that the system has the correct refrigerant charge. The system must also meet the system airflow requirement.	RA1.2, RA3.2
Verified Fault Indicator Display	A Fault Indicator Display can be installed as an alternative to refrigerant charge testing.	RA3.4.2
Verified Residential HVAC FDD		