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Docket Number:	17-AAER-16
Project Title:	2017 Section 100 Appliance Efficiency Standards HVI 916 Test Method Update
TN #:	221315-1
Document Title:	Statement of Explanation Changes to Title 20, Public Utilities and Energy
Description:	Statement of Explanation for Changes to title 20, Public Utilities and Energy. Section 1604. Test Methods for Specific Appliances. Section 1606. Filing by Manufacturers; Listing of Appliances in Database.
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Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	9/26/2017 7:26:18 AM
Docketed Date:	9/26/2017

CHANGES WITHOUT REGULATORY EFFECT UNDER

CALIFORNIA CODE OF REGULATIONS, TITLE 1, SECTION 100

Statement of Explanation

Changes to Title 20. Public Utilities and Energy.

Section 1604. *Test Methods for Specific Appliances.*

Section 1606. *Filing by Manufacturers; Listing of Appliances in Database.*

A. Factual Basis.

The 1974 Warren-Alquist State Energy Resources Conservation and Development Act enacted Public Resources Code § 25000 *et seq*., creating the California Energy Commission (CEC). Under Public Resources Code § 25213 and § 25218(e), CEC is authorized to adopt rules and regulations reasonable and necessary to carry out the provisions of the act, pursuant to Government Code § 11340 *et seq*.

CEC is required by Public Resources Code § 25402(a)-25402(c) to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy in the state. To do so, CEC sets energy efficiency standards for appliances as required by Public Resources Code § 25402(c). The regulation of energy efficiency requires the use of standard test methods for measuring energy efficiency for use by test laboratories. CEC specifies these test methods in California Code of Regulations, Title 20, § 1604.

When setting test methods, CEC often bases portions of its regulations on industry standard test methods, which are typically published in third party documents such as the Home Ventilation Institute (HVI)'s 2009 "Airflow Test Procedure." While these documents will typically contain testing information on a wide variety of products; it is common that CEC cite them only for a narrow subset of specific test measures. In this instance, §1604 only references the publication with regard to Whole House Fans and Residential Exhaust Fans. (Note that "Whole House Fans", as referenced in §1604, and "Whole House Comfort Ventilators", as referenced by HVI, are synonymous. Both refer to the same product. However, CEC uses the more common marketing term, whereas HVI uses the technical industry term.)

HVI ceased publishing its 2009 version of "Airflow Test Procedure", but has released a 2015 version of the publication, which contains the same tests for Whole House Fans and Residential Exhaust Fans as the 2009 edition. Because it is no longer possible to obtain copies of the 2009 version, CEC therefore wishes to update its incorporation by reference to the 2015 version in order to reduce confusion and restore the regulated community's access to the test methods that are required by Title 20. The 2015 edition is readily available online at https://www.hvi.org/ratings/Publication_916_09292015.pdf.

Title 20 only refers to HVI's test methods for the purposes of testing the efficiency of Whole House Fans and Residential Exhaust Fans. Section 5.2 specifies which test methods apply to certain products. Thus, the relevant scope of this incorporation by reference remains limited to Test Setups #1, 3, 4, 8, and 9 (Residential Exhaust Fans) and #14 and 15 (Whole House Fans.) Therefore, test methods for other products (e.g. #19, duct termination fittings) or other procedural requirements unrelated to the procedures set forth in Title 20 (such as HVI's recommendations for copy retention) are neither applicable nor relevant to a member of the regulated community's use of this document in complying with Title 20.

B. Other nonsubstantive clarifications and corrections.

In addition to updating the incorporation by reference from the unavailable 2009 edition to the 2015 edition, CEC wishes to take the opportunity to also make two minor clarifications. First, CEC wishes to remove an unnecessary and confusing statement that whole house fans must be "tested with manufacturer-provided louvers in place." As discussed in detail below, all whole house fans tested according to the HVI test methods are required to be tested *as installed in accordance with all manufacturer instructions*. Whole House Fans that include manufacturer-provided louvers must therefore already be installed with them in place according to their installation instructions. However, for Whole House Fans that do not include any such louvers, this incorrect statement has caused unnecessary confusion. Since all Whole House Fans must be tested according to manufacturer installation instructions, removing this statement is a nonsubstantive change. (CEC also proposes to make a similar clarification in §1606, for the same reasons.)

Finally, CEC wishes to correct an erroneous reference to an older (2005) edition of the HVI publication.

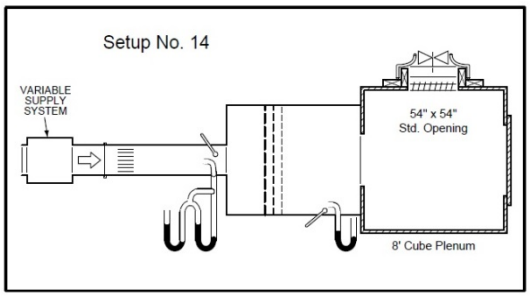
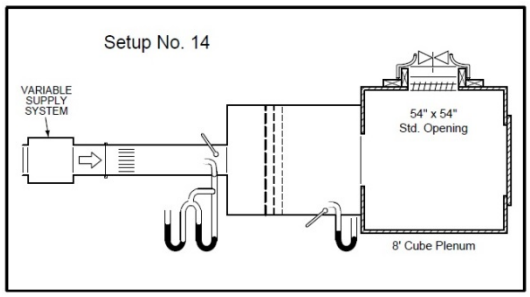
C. HVI 2009 and 2015 Publications Incorporated by Reference Contain the Same Test Methods

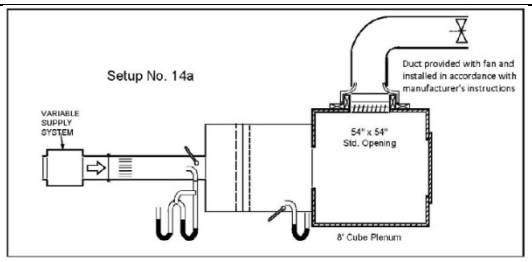
Both HVI and CEC technical and legal staff have independently verified and concluded that despite some minor technical clarifications, the 2009 and 2015 HVI documents set forth the same test methods for Residential Exhaust Fans and Whole House Fans.

CEC technical and legal staff held a conference call with HVI's lead technical expert to discuss the reasons for each technical clarification contained in the 2015 document. HVI confirmed that both documents are interchangeable, as there is no difference between the two test methods for Residential Exhaust Fans and Whole House Fans. In particular, HVI confirmed that it removed erroneous language that appeared to require various electrical measurements (fan input power) to be standardized to a certain air density. Since these measurements are not related to one another, this requirement was not only impossible to comply with, but nonsensical on its face. HVI confirmed that this language was included in error, hence its removal in the 2015 document.

There are no substantive changes between the 2009 and 2015 publications related to test methods for Whole House Fans or Residential Exhaust Fans. A comparison and discussion of all relevant changes between the 2009 and 2015 publications follows. Compared to the 2009 document, **new language** included in the 2015 publication is indicated by bold and underline, while ~~removed language~~ is indicated by strikeout for ease of reading. For convenience, each section of the comparison notes the specific appliance to which these incorporations by reference are applicable (whole house fans or residential exhaust fans).

D. Comparison of HVI 2009 and 2015 Publications Incorporated By Reference

Appliance	HVI 2009	HVI 2015
Whole House Fans	6.1.Each setup shall be as shown in the Setup Figures, and shall simulate as nearly as practical actual field installation of the product under test, in accordance with the product's installation instructions. 6.2. Test product shall consist of a complete product as shipped and as expected to be installed in the field. Product with grilles, filters, dampers, or other accessories in the same package shall be tested with those items in place. **...** 6.24. Setup No. 14: Ducted inlet chamber with pilot traverse, whole house comfort ventilator mounted in "ceiling" of 8 ft. cube, plywood inlet chamber. Whole house comfort ventilators shall be tested with the shutter shipped with the fan or the smallest net free area shutter the Member offers with the fan or recommends.  	6.1.Each setup shall be as shown in the Setup Figures, and shall simulate as nearly as practical actual field installation of the product under test, in accordance with the product's installation instructions. 6.2. Test product shall consist of a complete product as shipped and as expected to be installed in the field. Product with grilles, filters, dampers, or other accessories in the same package shall be tested with those items in place. **...** 6.24. Setup No. 14: Ducted inlet chamber with pilot traverse, whole house comfort ventilator mounted in "ceiling" of 8 ft. cube, plywood inlet chamber. Whole house comfort ventilators shall be tested with the shutter shipped with the fan or the smallest net free area shutter the Member offers with the fan or recommends.  **6.24.1. Setup No. 14a: Whole house comfort ventilators supplied with duct and fan that are separate from damper assembly shall be tested as indicated in the installation instructions and referenced in Sections 6.1, 6.2, and 6.2.1.**

Discussion. HVI describes test procedures for "whole house comfort ventilators," which is HVI's term for what Title 20 §1602(d) defines as "whole house fans". These include designs with a fan located (1) *at* the damper assembly, or (2) *separate from* the damper assembly. The diagram in 6.24 depicts a whole house comfort ventilator located *at* the damper assembly. (*See previous page.*) This diagram caused confusion when testing fans *separate from* the damper assembly. The additional diagram in 6.24.1 depicts a fan *separate from* the damper assembly, but otherwise identical to the diagram in 6.24 to address this confusion. (*See above.*)

However, note that 6.1 and 6.2 already require testing with the device installed according to installation instructions. Therefore, regardless of this new language and diagram, whole house fans with fans separate from the damper assembly were already required to be tested as indicated above.

Therefore, 6.24.1 is a restatement that neither changes nor establishes any new regulatory provisions or requirements. Rather, it clarifies existing requirements already described in 6.1, 6.2, and 6.24.

Appliance	**HVI 2009**	**HVI 2015**
Residential exhaust fans.	7.2. Kitchen range hood working speed rating tests are optional for range hoods with multiple speeds. The purpose is to provide sound ratings more closely related to consumers' actual experience. 7.2.1. Working Speed, as adopted by HVI, is defined as the speed that produces 100 cfm, or the lowest speed above 100 cfm that a hood can produce, when working on the same duct system as the maximum speed test. The airflow test requires a specific test sequence, which follows. **...** 7.2.2.3. For two-speed range hoods, switch hood to low speed and adjust static pressure to same system curve as the maximum	7.2. Kitchen range hood working speed rating tests are optional for range hoods with multiple speeds. The purpose is to provide sound ratings more closely related to consumers' actual experience. 7.2.1. Working Speed, as adopted by HVI, is defined as the speed that produces 100 cfm, or the lowest speed above 100 cfm that a hood can produce, when working on the same duct system as the maximum speed test. **For consistency, if the airflow is less than 60% of the high speed rating, the Member may rate working speed at 0.03" w.g. Two-speed range hoods are required to produce at least 90 cfm.** The airflow test requires a specific test sequence, which follows. **...** 7.2.2.3. For two-speed range hoods, switch hood to low speed and adjust static pressure to same system curve as the maximum

	speed test. Two-speed hoods are required to produce at least 90 cfm for HVI working speed certification. Record motor rpm in addition to airflow and static pressure. **...** 7.2.3.3. Adjust the static pressure on the chamber and re-adjust the airflow until the above calculation, using measured static pressure and airflow values, returns the same system curve constant. (Note: Working speed static pressure will be quite low, sometimes in the order of 0.01 inches of water. It is also possible that some hoods will have a working speed considerably higher than 100 cfm.)	speed test. Two-speed hoods are required to produce at least 90 cfm for HVI working speed certification. Record motor rpm in addition to airflow and static pressure. **...** 7.2.3.3. Adjust the static pressure on the chamber and re-adjust the airflow until the above calculation, using measured static pressure and airflow values, returns the same system curve constant. (Note: Working speed static pressure will be quite low, sometimes in the order of 0.01**" w.g.** ~~inches of water.~~ **If the airflow is less than 60% of the high speed rating, the Member may rate working speed at 0.03" w.g.** It is also possible that some hoods will have a working speed considerably higher than 100 cfm.)

Discussion. Kitchen range hoods may be classified as a type of residential exhaust fan. As stated in 7.2, working speed tests are optional for multiple speed range hoods.

Any range hood that is not a single-speed range hood is a multiple-speed range hood. Therefore, two-speed range hoods are multiple-speed range hoods. Because this additional language refers to a range hood that has a "high speed rating", it must have at least two speeds, and therefore must be a multiple-speed range hood. In addition, this language refers to a working speed test. Therefore, this language only applies to working speed tests for multiple speed range hoods, which are optional. This is therefore not a regulatory requirement, and the change therefore does not have regulatory effect with regard to residential exhaust fans.

Appliance	**HVI 2009**	**HVI 2015**
Residential exhaust fans	7.2.2. In each selected hood configuration (vertical, horizontal, etc.) the normal maximum speed airflow test is conducted first, then the working speed test while in the same setup. Although working speed is a single point, the conversion to standard density may require that two points be established with the point interpolated between them." **...**	7.2.2. In each selected hood configuration (vertical, horizontal, etc.) the normal maximum speed airflow test is conducted first, then the working speed test while in the same setup. Although working speed is a single point, the conversion to standard density may require that two points be established with the point interpolated between them." **...** **7.3.11. Mathematical (straight line) interpolation between closely spaced test points may be used to determine rating point(s).**

		...
	7.3.12. Fan power shall be recorded as motor input in watts at each test point and converted to standard atmospheric conditions using density ratio.	7.3.12. Fan power shall be recorded as motor input in watts at each test point ~~and converted to standard atmospheric conditions using density ratio~~.
	...	...
	Appendix I. 4.1.5. Pressures and fan power input are converted to standard air density.	Appendix I. 4.1.5. Pressures ~~and fan power input~~ are converted to standard air density.

Discussion. Both CEC and HVI technical staff confirmed that the addition of 7.3.11 is merely a technical clarifying comment on existing industry practice. Mathematical (straight line) interpolation is the only form of interpolation that is or could be used when conducting these tests; this does not change any requirement, but rather restates the only available procedure for clarity.

7.3.12 removes confusing and erroneous language not relevant to the test procedure. Both CEC and HVI technical staff confirmed that fan power is an electrical measurement that is unrelated to air density, and that this language was erroneous. The requirement was both impossible to comply with and nonsensical. Furthermore, 7.3.13 (unchanged from 2009) specifies the same density ratio. In addition, Section 4.11.4, Appendix I. 4.1.5, 5.4.1, and 5.4.3 contained similarly erroneous language, which was also removed for the same reason. As it was never possible to comply with these erroneous requirements, there is no change in regulatory effect. (Note that the addition of the term "efficacy" in Appendix I. 5.4.3 is a redundant clarification; efficacy is watts per CFM.)

While there are additional differences between the HVI 2009 and 2015 documents, as discussed above, these are either procedural requirements or are otherwise not related to Test Setups #1, 3, 4, 8, or 9 (Residential Exhaust Fans) or #14 or 15 (Whole House Fans). For example, changes made to section 3.3.1, section 6.29, section 7.1.6, section 7.3.4.1, and section 7.3.15.1 deal with products other than Residential Exhaust Fans or Whole House Fans, such as duct termination fittings or various passive ventilation systems, which are not regulated by §1604 and are therefore without regulatory effect.

Other changes, such as those to 7.3.17 and 7.3.18, concern procedural reporting guidelines applicable only to HVI members' use of the publication, rather than manufacturer certification to the Energy Commission pursuant to California's Appliance Efficiency Regulations, which are specified in §1601 *et seq*. These reporting guidelines do not concern test methods for Residential Exhaust Fans or Whole House Fans and are therefore without regulatory effect.

Finally, any minor differences between the sample data form provided in Appendix I. 7.2 do not have any bearing on test methods for Residential Exhaust Fans or Whole House Fans.

E. Proposed Changes to § 1604.

§ 1604. Test Methods for Specific Appliances.

...

(d) Spot Air Conditioners, Evaporative Coolers, Ceiling Fans, Ceiling Fan Light Kits, Whole House Fans, Residential Exhaust Fans, and Dehumidifiers. The test methods for spot air conditioners, evaporative coolers, ceiling fans, ceiling fan light kits, whole house fans, residential exhaust fans, and dehumidifiers are shown in Table D-1.

Table D-1

Spot Air Conditioner, Ceiling Fan, Ceiling Fan Light Kit, Evaporative Cooler, Whole House Fan, Residential Exhaust Fan, and Dehumidifier Test Methods

Appliance	*Test Method*
...	**...**
Whole House Fans	HVI **Publication** 916~~, tested with manufacturer-provided louvers in place (2009)~~ **29 September 2015 HVI Airflow Test Procedure, as specified in section 5.2.** **Use setups for whole house comfort ventilators.**
...	**...**
Residential Exhaust Fans	HVI **Publication** 916 ~~(2009)~~ **29 September 2015 HVI Airflow Test Procedure, as specified in section 5.2.**
...	**...**

...

The following documents are incorporated by reference in Section 1604.

...

HOME VENTILATING INSTITUTE (HVI)

HVI Publication 916 ~~(2005)~~ **29 September 2015 HVI Airflow Test Procedure**

...

Note: Authority cited: Sections 25213, 25218(e), 25402(a)-25402(c) and 25960, Public Resources Code; and sections 16, 26 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Sections 25216.5(d), 25402(a)-25402(c) and 25960, Public Resources Code; and section 16, Governor's Exec. Order No. B-29-15 (April 1, 2015).

D. Proposed Changes to § 1606.

Proposed changes to § 1606:

§ 1606. Filing by Manufacturers; Listing of Appliances in Database.

(a) Filing of Statements.

...

(4) Declaration.

...

g. for whole house fans, all appliances were tested to HVI-916, and **if equipped with louvers** were tested with manufacturer-provided louvers in place;

...

Note: Authority cited: Sections 25213, 25218(e), 25402(a)-25402(c) and 25960, Public Resources Code; and sections 16, 26 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Sections 25216.5(d), 25402(a)-25402(c), 25402.5.4 and 25960, Public Resources Code; and section 16, Governor's Exec. Order No. B-29-15 (April 1, 2015).

F. Attachment.

HVI AIRFLOW TEST PROCEDURE 916 – 2009 Rev. Edition (March 1, 2009) is included as an attachment to this Statement of Explanation as a reference.