DOCKETED	
Docket Number:	20-AAER-02
Project Title:	Air Filters
TN #:	245902
Document Title:	Jeff R Miller, PE Comments - Jeff Miller, PE comments to docket 20-AAER-02 regarding 15-day language for proposed air filter label regulations
Description:	N/A
Filer:	System
Organization:	Jeff R Miller, PE
Submitter Role:	Public
Submission Date:	9/7/2022 7:39:02 PM
Docketed Date:	9/8/2022

Comment Received From: Jeff R Miller, PE
Submitted On: 9/7/2022
Docket Number: 20-AAER-02

Jeff Miller, PE comments to docket 20-AAER-02 regarding 15-day language for proposed air filter label regulations

Additional submitted attachment is included below.

Date: September 07, 2022

Subject: Jeff Miller, PE comments to docket 20-AAER-02 regarding 15-day language for proposed air filter label regulations.

I was on staff in the CEC building standards office for approximately 15 years, and was a subject matter expert responsible for residential HVAC systems, indoor air quality ventilation systems, and air filter issues, among other subjects during my time on staff. I was directly involved with support of the development of the air filter label regulations beginning in 2012 and provided support for further development as needed throughout the remainder of my time on staff at the CEC. I retired from state service and from all other professional endeavors in November 2021.

The 15-day language for the air filter label regulations that was recently posted to the docket 20-AAER-02 has introduced a new/simplified label shown in Table Z-3 that has drastically reduced the information shown on the label. Thus the proposed changes in this recently posted 15-day language have defeated the ability to use this filter label to determine air filter sizing compliance in the field for the vast majority of space conditioning system installations.

The comment write-up that follows and the files attached at the end of this comment write-up describe a summary of my concerns. I am including some background information in case that is helpful.

Background

In order to improve HVAC system performance and efficiency, a manufacturer product label was needed to provide:

1. Information needed by HVAC system designers to enable proper sizing of air filters to ensure the air filters would not choke the system airflow.
2. Information needed for dwelling occupants to select air filter replacement products that conform to the specification determined by the HVAC system designer.
3. And to the extent that Title 24 part 6 specifies any requirement for air filter particle size efficiency and air filter sizing design (pressure drop performance), the manufacturer product label was needed to provide information to enable compliance with Title 24 Part 6 design, and to enable field verification procedures for installed systems.

Note: Title 24 Part 6 Section 150.0(m)12 and (m)13 language and an extract from the single-family compliance manual are attached for reference to support the following descriptions/discussions. The same information is found in the multifamily regulations/manuals, but for simplicity I am composing my comments referencing only the residential single family dwelling regulations/manual.

Design airflow and pressure drop – system sizing

Section 150.0(m)12Ai requires space conditioning systems to have air filters that comply with Sections 150.0(m)12B, 150.0(m)12C, 150.0(m)12D and 150.0(m)12E.

150.0(m)12B requires systems to be designed to accommodate the clean-filter pressure drop imposed by the system air filter(s) and further requires the design airflow rate and maximum allowable clean-

filter pressure drop to be determined and reported on a "sticker" that the installer places at the return grille (or air filter installation location) according to Subsection iv. There is an important distinction between the manufacturer product/performance label and the "sticker" that the system installer/designer places in the return grille or adjacent to the filter rack for use by the dwelling occupant or the field verification technician. The dwelling occupant needs the installers design "sticker" in order to confirm that replacement air filters meet the intended performance determined by the system designer/installer. And the "sticker" is needed for field verification to determine compliance with the Title 24 Part 6 requirements for filter sizing (pressure drop and airflow). The single-family residential compliance manual provides additional information about this in Section 4.4.1.14.5. Examples of both the manufacturer product label and the installer's sticker are shown and discussed. The same information is given in the nonresidential/multifamily compliance manual.

Discussion

It is important to understand that Section 150.0(m)12Bii does not require all systems to comply with an air filter pressure drop of 0.1 inch w.c.. 0.1 inch w.c. is only required when 1-inch depth filters are used, or if the return duct design alternative to fan efficacy measurement shown in Tables 150.0-B and Table 150.0-C are used. These system design/compliance alternatives are very restrictive and are unlikely to be used frequently since better system design options such as 2-inch depth air filters are allowed by the Title 24 Part 6 Standards. All systems other than those that use 1-inch air filters or Tables 150.0-B or C use design values of pressure drop determined by the system designer which may range from 0.05 to 0.3 inch w.c., or more.

It is important to understand that the manufacturers' air filter label was deliberately required to be placed on the air filter frame because that is where the information is needed during field verification of the installed air filter. Expecting product packaging that shows performance information will be made available for field verification inspections is not a practical or reasonable expectation for use in a field verification/inspection protocol.

It is important to understand that in order to determine compliance with the many potential design pressure drop vs airflow criteria used by various system designers/installers, all of the ordered pairs of airflow vs pressure drop shown on the "Table Z-1 or Table Z-2" label must be shown on the air filter frame. A label that displays performance only at 0.1 inch w.c. is not sufficient for determining compliance for the vast majority of system installations.

Compliance at pressure drops other than 0.1 inch w.c. may be determined in several ways which are discussed in the compliance manuals. Since the values from the manufacturer air filter performance tests vary a lot due to the wide range of resistances to flow each air filter has, the airflow vs pressure drop performance listed on the manufacturers' air filter product labels will vary a lot and will not likely display a value exactly the same as the installer's "sticker" placed in the return grille. So in order to determine compliance for a specific installed system, with its unique system design airflow and pressure drop specifications, a graphical or statistical calculation technique is used as described in the SF

Residential compliance manual in section 4.4.1.14.6. Additionally, the air filter label 15-day language provides an additional calculation method in Section 1604(c)(3)(B). These calculations rely on the ordered pairs of pressure drop vs airflow from the test procedures that are expected to be shown on the air filter label. These calculations are very easy to input into a spreadsheet or phone app, or the manufacturer may provide graphical formats for air filter families for lookup in the field. It is reasonable to expect that field verification technicians will be equipped to use these data from the manufacturers' air filter product labels to verify that the air filter's installed performance complies with the design pressure drop and airflow rates shown on the "sticker" placed in the return grille by the system designer/installer.

It is important to understand that the newly proposed simplified label in Table Z-3 does not change or reduce the burden on the manufacturer to integrate a label into their manufacturing process, as compared to the requirement for the Table Z-1 and Z-2 manufacturer product label. The burden on the manufacturer is due to the requirement for product testing to develop the data for the labels, and also with the burden that a change to the manufacturers product manufacturing process to add the label to the filter frame must be implemented. The burden due to revision of the manufacturer's manufacturing process is the same regardless of the appearance of the label the CEC requires. Also, in order to determine the information shown on the new simplified label, the same testing must be performed by the manufacturer as was needed for the Z-1, Z-2 labels, except that an additional calculation to determine the airflow rate at 0.1 inch w.c. must also be done for the Table Z-3 label. The CEC staff assertion (see TN245718 Section 1606) that the new simplified label has relieved some of the burden on the manufacturer to implement the label is apparently without merit.

Recommendations

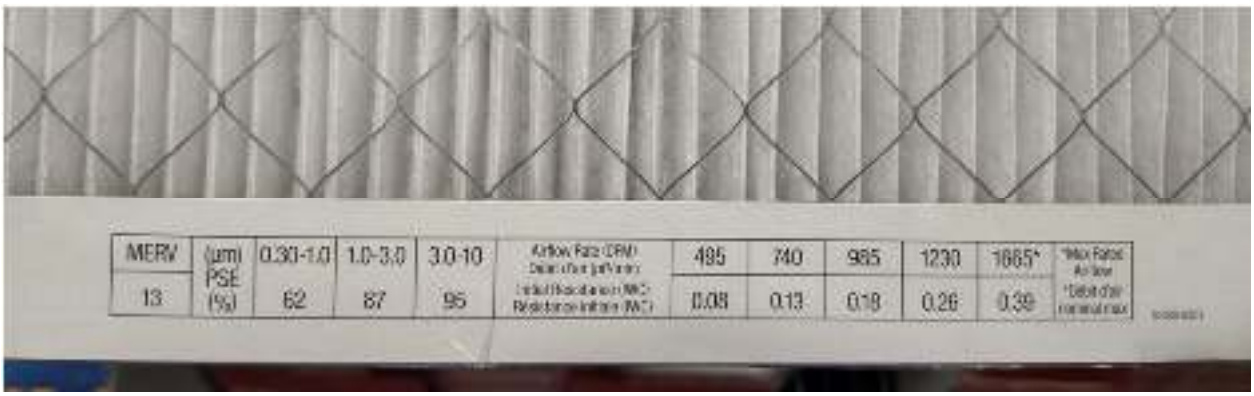
Changes to 15-day language

At the end of this comment write-up I have attached a tracked change version of the 15-day language that provides my suggested changes. Generally I have suggested rejecting most of the 15-day changes that introduced the new simplified label shown in Table Z-3 in the current 15 day language.

For the period between April 01 2023 and January 01, 2026, instead of requiring that the information be placed only on the packaging, I suggest that the regulations allow the manufacturer to choose at least one of 2 alternative locations for the air filter label information: 1) on the product packaging, 2) on the edge of the filter frame. This tact allows the manufacturer to choose the method that suits their situation the best.

For instance, 3M has continued to display the label from the 2015 air filter rulemaking on the air filter frame for their commercial products (I checked again at Lowes this morning – see picture in figure 1 below). Since 3M has made the label visible through the product packaging, the label does not need to also be shown on the product packaging. Thus if my suggestion was used, 3M would already be in compliance, and this rulemaking would not impose any change be made to their product labels or packaging.

Figure 1. Picture of 3M air filter label from air filter product on the shelf at Lowes on September 07, 2022



For the period beginning January 01, 2026, I suggest that the newly proposed simplified label NOT be used. And instead the label with the full set of performance data should be shown on the air filter frame (see tables Z-1 and Z-2 in the 15-day language and figure 1 above for examples of the label I propose be placed on the air filter frame). The 3 year lead time staff has proposed is very generous in my view. As I recall, 3M was able to implement the label on the air filter frames of their products within the 1 year lead time allowed by the 2015 air filter label rulemaking.

If the new simplified label shown in Table Z-3 is required to be placed on the filter frame instead of the Table Z-1 and Z-2 versions, it will defeat the ability to use the label for field verification for most installations which was major benefit that was expected to be gained from air filter labels.

It would be a shame to require the “Table Z-2” version of the label to be removed from the 3M products and instead require the Table Z-3 label to be used (in my view). 3M is the highest sales volume air filter manufacturer in the California market as far as I know.

I strongly recommend that you abandon the proposed simplified label shown in Table Z-3 in the 15-day language. It does not provide support for field verification for most installations and does not meet the requirement specified in Title 24 Part 6 Section 150.0(m)12E.

Thank you for the opportunity to comment.

Sincerely

Jeff Miller

DOCKETED	
Docket Number:	20-AAER-02
Project Title:	Air Filters
TN #:	245719
Document Title:	Express Terms for Air Filter Regulation
Description:	Proposed regulatory language for Air Filters, supersedes docket entry TN 245618
Filer:	Alex Galdamez
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	8/29/2022 12:31:18 PM
Docketed Date:	8/29/2022

Proposed Regulatory Language

California Code of Regulations
Title 20. Public Utilities and Energy
Division 2. State Energy Resources Conservation and Development Commission
Chapter 4. Energy Conservation Article 4.
Appliance Efficiency Regulations Sections
1601-1609
As related to air filters

The proposed new language appears as underline (example) and proposed deletions appear as strikeout (~~example~~). Additional amendments being proposed for a 15-day public comment period are shown in double strike (~~example~~) for deletions and double underline (example) for additions. Existing language appears as plain text. Three dots or "…" represents the substance of the regulations that exists between the proposed language and current language.

Section 1601. Scope

This Article applies to the following types of new appliances, if sold or offered for sale in California, except those sold wholesale in California for final retail sale outside the state and those designed and sold exclusively for use in recreational vehicles, or other mobile equipment. Unless otherwise specified, each provision applies only to units manufactured on or after the effective date of the provision.

NOTE: For the applicability of these regulations to appliances installed in new building construction, see sections 110.0 and 110.1 of Part 6 of Title 24 of the California Code of Regulations.

…[skipping (a) and (b)]

(c) Central air conditioners, which are electrically powered unitary air conditioners and electrically powered unitary heat pumps, except those designed to operate without a fan; and gas-fired air conditioners and gas-fired heat pumps, air filters ~~for residential buildings for use in forced-air heating or forced-air cooling equipment~~, and heat pump water-heating packages.

…[skipping "(d) Portable air conditioners, evaporative coolers…", through end of section]

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).

Section 1602. Definitions

…[skipping (a) and (b)]

(c) Air Conditioners, Air Filters, and Heat Pump Water-Heating Packages.

…[skipping "Air Conditioner" and "Air-cooled air conditioner"]

"Air filter" means ~~an~~a disposable or reusable air-cleaning device with air filtering media encased in a frame of a nominal depth of no greater than 6.0 inches ~~installed in forced air heating or cooling equipment and~~ used for removing particulate matter from the air and designed for installation in residential ducted forced-air ventilation, heating or cooling systems.

(1) Air filter does not include:

(A) Electronic air cleaners;

(B) Filter media sold as rolls, i.e. not encased in a frame;

(C) Air filters designed and sold exclusively for installation in products other than residential ducted forced-air systems.

…[skipping "Air filter depth" to "Air-source heat pump"]

"Basic model" of an air filter means all units of a given type of air filter, irrespective of the face area dimensions, that have the same depth and the same construction, including type and grade of air filter media, pleat spacing, pleat height, pleat support, and filter frame pattern.

…[skipping "Basic model" of a federally regulated central air… to "Dust holding capacity~~Maximum rated airflow rate~~"]

"Electronic air cleaner" means electrically powered filtration equipment that uses high voltage electrostatic principles to collect particulate matter. It may be of single-stage or multi-stage configuration. Part or all of the charging and/or collecting sections may be manually cleanable, automatically cleanable, or disposable.

"Minimum efficiency reporting value (MERV)" of an air filter means the composite particle efficiency metric defined in ANSI/ASHRAE Standard 52.2-~~2012~~2017.

…[skipping "Multi-head mini-split system" to "Particle size"]

"Particle size efficiency" of an air filter, also known as "particle size removal efficiency", means the fraction (percentage) of particles that are captured on the air filter. Particle size efficiency is measured in three particle size ranges: 0.3-1.0,

1.0-3.0, 3.0-10 micrometers (μm). Particle size efficiency is abbreviated as "PSE" in the required ~~labels~~ marking for air filters.

…[skipping "Premium motor"]

"Pressure drop" of an air filter means the drop in static pressure versus air flow rate across air filter media in the forced-air ventilation, heating or cooling ~~equipment~~ system.

…[skipping "Room air conditioner" through (x)"Landscape Irrigation Equipment"]

The following documents are incorporated by reference in Section 1602.

…[skipping FEDERAL STATUTES AND REGULATIONS to ADOBE SYSTEMS INCORPORATED]

Number	Title
	AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
ANSI/ASHRAE Standard 52.2-2017	Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size

…[skipping ANSI C78.1-1991 (R1996) to end of section]

Note: Sections 25213, 25128(e), 25402(a)-25402(c) and 25960, Public Resources Code; and sections 16, 26 and 30, Governor's Exc. 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).

Section 1604. Test Methods for Specific Appliances

…[skipping (a) and (b)]

(c) Central Air Conditioners, Air Filters, and Heat Pump Water-Heating Packages.

...[skipping (1) and (2)]

(3) Air Filters.

(A) The test methods for air filters are shown in Table C-2. Manufacturers shall test each basic model of air filter at dimensions determined by the manufacturer.

Table C-2: Air Filter Test Methods

Appliance Performance Criteria	**Test Method**
Air Filter Pressure Drop	~~AHRI 680-2009*~~ AHRI Standard 680 (I-P)-2017* or ~~ANSI/ASHRAE Standard 52.2-2012~~ ANSI/ASHRAE Standard 52.2-2017
Minimum Efficiency Reporting Value (MERV)	~~ANSI/ASHRAE Standard 52.2-2012~~ANSI/ASHRAE Standard 52.2-2017
Air Filter Particle Size Efficiency	~~AHRI 680-2009*~~ AHRI Standard 680 (I-P)-2017* or ANSI/ASHRAE Standard 52.2-2017 ~~ANSI/ASHRAE Standard 52.2-2012~~
Dust Holding Capacity	~~AHRI 680-2009*~~AHRI Standard 680 (I-P)-2017* or ANSI/ASHRAE Standard 52.2-2017 ~~ANSI/ASHRAE Standard 52.2-2012~~
* MERV not reportable for models being tested to AHRI Standard 680 (I-P)-2017 ~~AHRI 680-2009~~ only	

(B) The following procedure shall be used to calculate the airflow rate value in cubic feet per minute at an initial resistance pressure difference of 0.1 inches water column:

1. The value or airflow rate at an initial resistance of 0.1 inches water column shall be determined from a least-squares fit to airflow rate in cfm, as a function of initial resistance static pressure difference in inches water column, using:

$Q = C \times d\mathrm{P}^n$, where Q=airflow rate in cfm, dP=initial resistance pressure difference in inches water column, and C and n are the coefficients determined in the least squares fit.

2. The data used for this fit shall be the following ordered pairs: (0,0), (initial resistance value 1, airflow rate value 1), (initial resistance value 2, airflow rate value 2), (initial resistance value 3, airflow rate value 3), (initial resistance value 4, airflow rate value 4), (initial resistance value 5,

airflow rate value 5 (only applicable when using the ANSI/ASHRAE Standard 52.2-2017 test procedure))

3. The value for airflow rate at an initial resistance of 0.1-inch water column shall be calculated as: $QQ = CC \times 0.1^{nn}$

~~Manufacturers shall test small, medium, and large size filters for each grade.~~

…[skipping (c)(4) through (x)]

The following documents are incorporated by reference in section 1604.

Number	Title

…[skipping FEDERAL TEST METHODS and UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (EPA)]

AIR-CONDITIONING, HEATING, AND REFRIGERATION INSTITUTE (AHRI)

AHRI ~~680-20092009~~Standard 680 (I-P)-2017	~~2009~~2017 Standard for Performance Rating of Residential Air Filter Equipment

…[skipping the rest of AIR-CONDITIONING, HEATING, AND REFRIGERATION INSTITUTE (AHRI)]

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI/ASHRAE Standard 52.2-2017	Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size

...[skipping the rest of AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) through AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)]

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

~~ASHRAE 52.2-2012~~	~~Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size~~

…[skipping ANSI/ASHRAE 118.2-1993 to end of section]

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).

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

(a) Filing of Statements.

Each manufacturer shall electronically file with the Executive Director through the MAEDbS a statement for each appliance that is sold or offered for sale in California. The statement shall contain all the information described in paragraphs (2) through (4) of this subsection and shall meet all of the requirements of paragraph (1) of this subsection and all other applicable requirements in this Article.

The effective dates of this section shall be the same as the effective dates shown in section 1605.1, 1605.2 or 1605.3 of this Article for appliances for which there is an energy efficiency, energy consumption, energy design, water efficiency, water consumption, or water design standard in section 1605.1, 1605.2, or 1605.3 of this Article. For appliances with no energy efficiency, energy consumption, energy design, water efficiency, water consumption, or water design standard in section 1605.1, 1605.2, or 1605.3 of this Article, the effective date of this section shall be one year after they are added to section 1601 of this Article, unless a different effective date is specified.

EXCEPTIONS to Section 1606(a) of this Article: Section 1606(a) of this Article is not applicable to:

1. external power supplies,

2. small electric motors,

3. á la carte chargers meeting the EXCEPTON noted in section 1605.3(w)(2) of this Article, or

4. general service lamps

(1) General Rules.

…[skipping (A) to (H)]

(I) Air Filters. The statement for air filters shall be for each basic model of air filter tested under section 1604(c)(3) of this Article.

...[skipping (a)(2) through (a)(3)(D)]

Table X: Data Submittal Requirements

…[skipping "All Appliances" to B "Packaged Terminal Air Conditioners and Packaged Terminal Heat Pumps"]

C	Air Filters manufactured on or after ~~April 1, 2019 December 1, 2022~~April 1, 2023	~~Air filter sizes tested~~	~~Small, medium, and large~~
		~~Minimum Efficiency Reporting Value~~ (MERV) (reportable for models tested to ASHRAE 52.2-2012 only)	~~1, 2, 3, 4, 5, 6, 7,~~ 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, N/A
		~~Particle Size Efficiency for 0.3 to 1.0 µm particle size~~	
		~~Particle Size Efficiency for 1.0 to 3.0 µm particle size~~	
		~~Particle Size Efficiency for 3.0 to 10.0 µm particle size~~	
		~~Test Procedure used to determine air filter efficiency performance~~	~~AHRI 680-2009, or ASHRAE 52.2-2012~~
		~~Air Filter Length~~	
		~~Air Filter Width~~	
		~~Air Filter Depth~~	
		~~Air Filter Face Area~~	
		~~Face Velocity Utilized for the test procedure~~	~~Value in feet per minute or N/A~~
		~~Airflow Rate value 1~~	
		~~Airflow Rate value 2~~	
		~~Airflow Rate value 3~~	
		~~Airflow Rate value 4~~	
		~~Airflow Rate value 5 Maximum Rated Airflow Rate~~	
		~~Initial Resistance at air flow rate value 1~~	~~Test results to one-hundredths of an~~

			~~Inch of Water Column~~
		~~Initial Resistance at airflow rate value 2~~	~~Test results to one-hundredths of an Inch of Water Column~~
		~~Initial Resistance at airflow rate value 3~~	~~Test results to one-hundredths of an Inch of Water Column~~
		~~Initial Resistance at airflow rate value 4~~	~~Test results to one-hundredths of an Inch of Water Column~~
		~~Initial Resistance at airflow rate value 5~~	~~Test results to one-hundredths of an Inch of Water Column~~
		~~Final Resistance at the point where test is terminated and results determined~~	~~Test results to one-hundredths of an Inch of Water Column~~
		~~Dust Holding Capacity at the maximum rated airflow rate as published by the manufacturer~~	~~Test results in multiples of one gram.~~
		~~Airflow Rate value determined at an Initial Resistance of 0.1 Inch of Water Column~~	
		Length of tested air filter (inches)	
		Width of tested air filter (inches)	
		Depth of tested air filter (inches)	
		Face Area of tested air filter (square inches)	
		Test Procedure used	AHRI Standard 680 (I-P)-2017, ANSI/ASHRAE

			Standard 52.2-2017
		Face Velocity Utilized for the test procedure (feet per minute)	
		Minimum Efficiency Reporting Value (MERV) (if ANSI/ASHRAE Standard 52.2-2017 was used)	
		~~Particulate Matter (PM) Efficiency for PM 1.0~~ Particle Size Efficiency for 0.3 to 1.0 µm particle size (percentage)	
		Particle Size Efficiency for 1.0 to 3.0 µm particle size (percentage)	
		Particle Size Efficiency for 3.0 to 10.0 µm particle size (percentage)	
		Airflow Rate value 1 (cubic feet per minute)	
		Airflow Rate value 2 (cubic feet per minute)	
		Airflow Rate value 3 (cubic feet per minute)	
		Airflow Rate value 4 (cubic feet per minute)	
		Airflow Rate value 5 (cubic feet per minute) (Maximum Airflow Rate if ANSI/ASHRAE Standard 52.2-2017 was used)	
		Calculated Airflow Rate value at an Initial Resistance of 0.1 inches water column (cubic feet per minute)~~7~~	
		Initial Resistance at air flow rate value 1 (inches water column)	
		Initial Resistance at airflow rate value 2 (inches water column)	
		Initial Resistance at airflow rate value 3 (inches water column)	

		Initial Resistance at airflow rate value 4 (inches water column)	
		Initial Resistance at airflow rate value 5 (inches water column) (if ANSI/ASHRAE Standard 52.2-2017 was used)	
		Final Resistance at the point where test is terminated and results determined (inches water column)	
		Dust Holding Capacity at the maximum rated airflow rate as published by the manufacturer (grams)	

…[skipping C All Central Air Conditioners… through end of Table X...]

The following documents are incorporated by reference in section 1606.

…[skipping CALIFORNIA ENERGY COMMISSION through FEDERAL STATUTES AND REGULATIONS]

Number	Title
AIR-CONDITIONING, HEATING, AND REFRIGERATION INSTITUTE (AHRI)	
AHRI Standard 680 (I-P)-2017	2017 Standard for Performance Rating of Residential Air Filter Equipment
AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)	
ANSI/ASHRAE Standard 52.2-2017	Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size

…[skipping NATIONAL ELECRTICAL MANUFACTURER'S ASSOCIATION (NEMA) through the end of section]

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).

Section 1607. Marking of Appliances

…[skipping (a) through (c)]

(d) Energy Performance Information

...[skipping (1) through (10)]

~~(11) Air Filters. Each unit of air filters manufactured on or after April 1, 2019 shall be marked, permanently and legibly, on an accessible and conspicuous place on the edge of the filter itself or on the pleats, in characters of font size 12, with the information specified in either section (A) or (B) below as applicable to the air filter model:~~

~~(A) Air filters for which the reported information is determined in accordance with the AHRI standard 680-2009 shall be marked with the following information:~~

~~1. Particle size efficiency (PSE) of the unit in three particle size ranges: 0.3-1.0, 1.0-3.0, 3.0-10 micrometers (μm).~~

~~2. Initial resistance for the range of airflow rates as published by the manufacturer, including the maximum rated airflow rate. The selected airflow rates shall be in multiples of 400 cfm. If the maximum rated airflow rate is not a multiple of 400 cfm, then report initial resistance at multiples of 400 cfm, and any fraction thereof, to include the maximum rated airflow rate as described in subsections a, b, c, d, e below.~~

~~a. Airflow Rate Value 1 (val 1) = 400 cubic feet per minute (cfm). If 400 cfm is not within the manufacturer's published range of airflow rates for the filter, value = N/A.~~

~~b. Airflow Rate Value 2 (val 2) = 800 cubic feet per minute (cfm). If 800 cfm is not within the manufacturer's published range of airflow rates for the filter, value = N/A.~~

~~c. Airflow Rate Value 3 (val 3) = 1200 cubic feet per minute (cfm). If 1200 cfm is not within the manufacturer's published range of airflow rates for the filter, value = N/A.~~

~~d. Airflow Rate Value 4 (val 4) = 1600 cubic feet per minute (cfm). If 1600 cfm is not within the manufacturer's published range of airflow rates for the filter, value = N/A~~

~~e. Airflow Rate Value 5 (val 5) = Maximum Rated Airflow Rate (cfm).~~

~~3. Mark the non-reported MERV information field as "N/A."~~

(B) Air filters for which reported information is determined in accordance with ASHRAE Standard 52.2-2012 shall be marked with the following information:

1. Particle size efficiency (PSE) of the unit in three particle size ranges: 0.3-1.0, 1.0-3.0, 3.0-10 micrometers (µm).
2. Initial resistance for the range of airflow rates as published by the manufacturer, including the maximum rated airflow rate. The airflow rate values shall be the maximum rated airflow rate, and the values for 50%, 75%, 100% and 125% of the test airflow rate value determined in accordance with ASHRAE 52.2-2012. as described in subsections a, b, c, d, e below.
   a. Airflow Rate Value 1 (val 1) = 50% of the test airflow rate in cubic-feet-per-minute (50% of airflow rate value 3).
   b. Airflow Rate Value 2 (val 2) = 75% of the test airflow rate in cubic-feet-per-minute (75% of airflow rate value 3).
   c. Airflow Rate Value 3 (val 3) = 100% test airflow rate in cubic-feet-per-minute; determined as equal to selected test face velocity (feet per minute) multiplied by the air filter face area (square feet).
   d. Airflow Rate Value 4 (val 4) = 125% of the test airflow rate in cubic-feet-per-minute (125% of airflow rate value 3.
   e. Airflow Rate Value 5 (val 5) = Maximum Rated Airflow Rate (cfm).
3. Minimum Efficiency Reporting Value (MERV).

The information shall be disclosed in the format in Table Z.

Table Z
Sample Air Filter Marking

MERV	***(µm)***	***0.30-1.0***	***1.0-3.0***	***3.0-10***	***Airflow Rate (CFM)***	***[val 1]***	***[val 2]***	***[val 3]***	***[val 4]***	***[val 5]***	***Max Rated Airflow**
[value]			[value]	[value]	Initial Resistance (IWC)	[value]	[value]	[value]	[value]	[value]	

If the marking on the air filter is not legible through its retail packaging, then the packaging shall also be labeled with the same information and in the same format as Table Z. The

~~requirements of this section shall not preclude manufacturers from providing additional information.~~

(11) Air Filters. Each unit of air filters manufactured on or after ~~December 1, 2022~~ April 1, 2023, shall be marked, permanently and legibly, on an accessible and conspicuous place on the edge of the filter itself or on the or on the air ~~edge of the filter itself or on the~~ ~~pleats,~~ filter retail package in characters of font size 12 or larger, with the information specified in either section (A) or (B) below as applicable to the air filter unit. If the marking is placed on the air filter frame and it is not legible through its retail packaging, then the packaging shall also be marked with the same information and in the same format. In addition, each unit of air filters manufactured on or after January 1, 2026, shall be marked, permanently and legibly, on an accessible and conspicuous place on the edge of the filter frame in font size 12 or larger characters, with the information specified in either section (A) or (B) below as applicable to the air filter unit. If the marking on the air filter is not legible through its retail packaging, then the packaging shall also be marked with the same information and in the same format. ~~the calculated airflow rate value at an Initial Resistance of 0.1 inches water column (cubic feet per minute), and with either the filter's particle size efficiency in the 0.3 to 1.0 micrometer range or the filter's MERV rating. If the marking on the air filter is not legible through its retail packaging, then the packaging shall also be marked with the same information and in the same format.~~ Sample air filter ~~markings~~ ~~package labels and air filter frame~~ markings are shown in Tables Z-1 and, ~~and~~ Z-2., ~~and Z-3.~~

(A) Air filters for which the basic model has been tested in accordance with AHRI Standard 680 (I-P)-2017.

1. Air filters that have been tested and for which the reported information is determined in accordance with the AHRI Standard 680 (I-P)-2017 shall be marked with the following information:

   a. Particle size efficiency (PSE) of the unit in three particle size ranges: 0.3-1.0, 1.0-3.0, 3.0-10 micrometers (μm).

   b. Initial resistance for the range of airflow rates as published by the manufacturer, including the maximum rated airflow rate. The airflow rate values shall be the values for 25%, 50%, 75%, and 100% of the maximum rated airflow rate determined in accordance with AHRI Standard 680 (I-P)-2017 as described in subsections (i), (ii), (iii), (iv) below.

(i) Airflow Rate Value 1 (val 1) = 25% of the maximum rated airflow rate in cfm (25% of airflow rate of value 4).

(ii) Airflow Rate Value 2 (val 2) =50% of the maximum rated airflow rate in cfm (50% of airflow rate of value 4).

(iii) Airflow Rate Value 3 (val 3) = 75% of the maximum rated airflow rate in cfm (75% of airflow rate of value 4).

(iv) Airflow Rate Value 4 (val 4) = 100% of the maximum rated airflow rate in cfm.

2. Air filter sizes that have not been tested shall be marked with information that is based on the information for an air filter of the same basic model which has been tested per section 1604(c)(3) of this Article in accordance with the AHRI Standard 680 (I-P)-2017 and certified to the Energy Commission per section 1606(a)(1)(I) of this Article. Information for an air filter that has not been tested shall be determined at a face velocity that is identical to the face velocity used for the test procedure for the tested air filter of the same basic model. Air filters that have not been tested shall be marked with the following information:

   a. Particle size efficiency (PSE) of the unit in three particle size ranges: 0.3-1.0, 1.0-3.0, 3.0-10 micrometers (μm). The PSE values for an air filter that has not been tested shall be identical to the PSE values determined for a tested air filter of the same basic model.

   b. Initial resistance values for the range of airflow rate values 1 through 4. The initial resistance values for an air filter that has not been tested shall be identical to the initial resistance values 1 through 4 determined for a tested air filter of the same basic model.

   c. Airflow rate values 1 through 4 for an air filter that has not been tested shall each be equal to the corresponding airflow rate values 1 through 4 from a tested air filter of the same basic model multiplied by the face area of the filter that has not been tested and divided by the face area of the tested air filter of the same basic model.

(B) Air filters for which the basic model has been tested in accordance with ANSI/ASHRAE Standard 52.2 2017.

1. Air filters that have been tested and for which the reported information is determined in accordance with ANSI/ASHRAE Standard 52.2-2017 shall be marked with the following information:

   a. Particle size efficiency (PSE) of the unit in three particle size ranges: 0.3-1.0, 1.0-3.0, 3.0-10 micrometers (μm).

   b. Initial resistance for the range of airflow rates as published by the manufacturer, including the maximum rated airflow rate.

The airflow rate values shall be the maximum rated airflow rate, and the values for 50%, 75%, 100% and 125% of the test airflow rate value determined in accordance with ANSI/ASHRAE 52.2-2017 as described in subsections (i), (ii), (iii), (iv), (v) below.

(i) Airflow Rate Value 1 (val 1) = 50% of the test airflow rate in cfm (50% of airflow rate value 3).

(ii) Airflow Rate Value 2 (val 2) = 75% of the test airflow rate in cfm (75% of airflow rate value 3).

(iii) Airflow Rate Value 3 (val 3) = 100% of the test airflow rate in cfm; determined as equal to selected test face velocity (feet per minute) multiplied by the air filter face area (square feet).

(iv) Airflow Rate Value 4 (val 4) = 125% of the test airflow rate in cfm (125% of airflow rate value 3).

(v) Airflow Rate Value 5 (val 5) = Maximum Rated Airflow Rate in cfm-as published by the manufacturer.

c. Minimum Efficiency Reporting Value (MERV). The value shall be a whole number between 1 and 16.

2. Air filter sizes that have not been tested shall be marked with information that is based on the information for an air filter of the same basic model which has been tested per section 1604(c)(3) of this Article in accordance with the ANSI/ASHRAE Standard 52.2-2017 and certified to the Energy Commission per section 1606(a)(1)(I) of this Article. Information for an air filter that has not been tested shall be determined at a face velocity that is identical to the face velocity used for the test procedure for the tested air filter of the same basic model. Air filters that have not been tested shall be marked with the following information:

a. Particle size efficiency (PSE) of the unit in three particle size ranges: 0.3-1.0, 1.0-3.0, 3.0-10 micrometers (μm). The PSE values for an air filter that has not been tested shall be identical to the PSE values determined for a tested air filter of the same basic model.

b. Initial resistance values for the range of airflow rate values 1 through 5. The initial resistance values for an air filter that has not been tested shall be identical to the initial resistance values

1 through 5 determined for a tested air filter of the same basic model.

c. Airflow rate values 1 through 5. Airflow rate values 1 through 5 for an air filter that has not been tested shall each be equal to the corresponding airflow rate values 1 through 5 from a tested air filter of the same basic model multiplied by the face area of the filter that has not been tested and divided by the face area of the tested air filter of the same basic model.

d. Minimum Efficiency Reporting Value (MERV). The MERV for an air filter that has not been tested shall be identical to the value determined for a tested air filter of the same basic model. The value shall be a whole number between 1 and 16.

Table Z-1: Sample Air Filter ~~Marking~~ ~~Package~~ Marking Label (AHRI Standard 680 [I-P]-2017)

(µm) PSE (%)	0.30-1.0	1.0-3.0	3.0-10	Airflow Rate (CFM)	[val 1]	[val 2]	[val 3]	[val 4]*	*Max Rated Airflow
	[val]	[val]	[val]	Initial Resistance (IWC)	[val]	[val]	[val]	[val]	

Table Z-2: Sample Air Filter ~~Marking~~ ~~Package~~ Marking Label (ANSI/ASHRAE Standard 52.2-2017)

MERV	(µm) PSE (%)	0.30-1.0	1.0-3.0	3.0-10	Airflow Rate (CFM)	[val1]	[val2]	[va3]	[val4]	[val5]*	*Max Rated Airflow
[val]		[val]	[val]	[val]	Initial Resistance (IWC)	[val]	[val]	[val]	[val]	[val]	

~~Table Z-3: Sample Air Filter Frame Markings~~

~~Sample Airflow Marking~~	~~Sample Filration Marking~~
~~Airflow: [val]~~	~~0.30 – 1.0 µm PSE: [val]~~ ~~or~~ ~~MERV: [val]~~

...[skipping (12) through the end of the section]

Note: Authority cited: Sections 25213, 25218(e), 25402(a)-25402(c) and 25960, Public Resources Code. Reference: Sections 25216.5(d), 25402(a)-25402(c) and 25960, Public Resources Code.