

**DOCKETED**

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*Comment Received From: Jeff Miller, PE*  
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**Jeff Miller, PE comment attachment 02**

*Additional submitted attachment is included below.*

**12. Air filtration.**

- A.** System types specified in Subsections i, ii, and iii shall be provided with air filters in accordance with Sections 150.0(m)12B, 150.0(m)12C, and 150.0(m)12D. System types specified in Subsection i shall also comply with Section 150.0(m)12E.
- i.** Mechanical space-conditioning systems that supply air to an occupiable space through ductwork exceeding 10 feet (3 m) in length.
  - ii.** Mechanical supply-only ventilation systems and makeup air systems that provide outside air to an occupiable space.
  - iii.** The supply side of mechanical balanced ventilation systems, including heat recovery ventilation systems, and energy recovery ventilation systems that provide outside air to an occupiable space.

**Exception 1 to Section 150.0(m)12A:** Evaporative coolers are exempt from the air filtration requirements in Section 150.0(m)12.

**B. System design and installation.**

- i.** The system shall be designed to ensure that all recirculated air and all outdoor air supplied to the occupiable space is filtered before passing through any system's thermal conditioning components.

**Exception 1 to Section 150.0(m)12Bi:** For heat recovery ventilators and energy recovery ventilators the location of the filters required by Section 150.0(m)12 may be downstream of a system thermal conditioning component, provided the system is equipped with ancillary filtration upstream of the system's thermal conditioning component.

- ii.** All systems shall be designed to accommodate the clean-filter pressure drop imposed by the system air filter(s). The design airflow rate and maximum allowable clean-filter pressure drop at the design airflow rate applicable to each air filter shall be determined and reported on labels according to Subsection iv below.

Systems specified in Section 150.0(m)12Ai shall be equipped with air filters that meet either Subsection a or b below.

- a.** Nominal two-inch minimum depth filter(s) shall be sized by the system designer, or
- b.** Nominal one-inch minimum depth filter(s) shall be allowed if the filter(s) are sized according to Equation 150.0-A, based on a maximum face velocity of 150 ft per minute, and according to the maximum allowable clean-filter pressure drop specified in Section 150.0(m)12Dii.

$$A_{\text{face}} = Q_{\text{filter}} / V_{\text{face}} \quad (\text{Equation 150.0-A})$$

where

$A_{\text{face}}$  = air filter face area, the product of air filter nominal length x nominal width, ft<sup>2</sup>.

$Q_{\text{filter}}$  = design airflow rate for the air filter, ft<sup>3</sup>/min.

$V_{\text{face}}$  = air filter face velocity £150, ft/min.

- iii.** All system air filters shall be located and installed in such a manner as to be accessible for regular service by the system owner.
- iv.** All system air filter installation locations shall be labeled to disclose the applicable design airflow rate and the maximum allowable clean-filter pressure drop. The labels shall be permanently affixed to the air filter installation location, readily legible, and visible to a person replacing the air filter.

- v. Filter racks or grilles shall use gaskets, sealing or other means to close gaps around inserted filters to and prevent air from bypassing the filter.
- C. Air filter efficiency.** The system shall be provided with air filter(s) having a designated efficiency equal to or greater than MERV 13 when tested **in accordance with ASHRAE Standard 52.2**, or a particle size efficiency rating equal to or greater than 50 percent in the 0.30-1.0 mm range, and equal to or greater than 85 percent in the 1.0-3.0 mm range when tested **in accordance with AHRI Standard 680**.
  - D. Air filter pressure drop.** All system shall be provided with air-filter(s) that conforms to the applicable maximum allowable clean-filter pressure drop specified in Subsections i, ii, iii, or iv below, when **tested using ASHRAE Standard 52.2**, or **as rated using AHRI Standard 680**, for the applicable design airflow rate(s) for the system air filter(s).
    - i. The maximum allowable clean-filter pressure drop **shall be determined by the system design** for the **nominal two-inch minimum depth air filter required by Section 150.0(m)12Biia**, or
    - ii. **A maximum of 25 PA (0.1 inches water) clean-filter pressure drop shall be allowed for a nominal one-inch depth air filter sized according to Section 150.0(m)12Biib**, or
    - iii. For systems specified in 150.0(m)12Aii, and 150.0(m)12Aiii, the maximum allowable clean filter pressure drop shall be determined by the system design.
    - iv. **If Exception 1 to Section 150.0(m)13B or D is utilized for compliance with cooling system airflow rate and fan efficacy requirements**, the clean-filter pressure drop for the system air filter shall conform to the requirements given in **Table 150.0-B or 150.0-C**.
  - E. Air filter product labeling.** Systems described in 150.0(m)12Ai shall be equipped with air filters that **have been labeled by the manufacturer to disclose the efficiency and pressure drop ratings that demonstrate conformance with Sections 150.0(m)12C and 150.0(m)12D**.
- 13. Space conditioning system airflow rate and fan efficacy.** Space conditioning systems that utilize forced air ducts to supply cooling to an occupiable space shall:
- A. **Static pressure probe.** Have a hole for the placement of a static pressure probe (HSPP), or a permanently installed static pressure probe (PSPP) in the supply plenum downstream of the air conditioning evaporator coil. The size, location, and labeling of the HSPP or PSPP shall conform to the requirements specified in Reference Residential Appendix RA3.3.1.1 as confirmed by field verification and diagnostic testing; and
 

**Exception to 150.0(m)13A:** Systems that cannot conform to the specifications for hole location in Reference Residential Appendix Figure RA3.3-1 shall not be required to provide holes as described in Figure RA3.3-1.
  - B. **Single zone central forced air systems.** Demonstrate, in every control mode, airflow greater than or equal to 350 CFM per ton of nominal cooling capacity through the return grilles, and an air-handling unit fan efficacy less than or equal to the maximum W/CFM specified in Subsections i or ii below. The airflow rate and fan efficacy requirements in this section shall be confirmed by field verification and diagnostic testing in accordance with the procedures given in Reference Residential Appendix RA3.3.
    - i. 0.45 W/CFM for gas furnace air-handling units.
    - ii. 0.58 W/CFM for air-handling units that are not gas furnaces.
  - C. **Zonally controlled central forced air systems.** Zonally controlled central forced air cooling systems shall be capable of simultaneously delivering, in every zonal control mode, an airflow from the dwelling, through the air handler fan and delivered to the dwelling, of greater than or equal to 350 cfm per ton of nominal cooling capacity, and operating at an air-handling unit fan efficacy of less than or equal to the maximum W/CFM specified in Subsections i or ii below. The airflow rate and fan efficacy requirements in this section shall be confirmed by field verification and diagnostic testing in accordance with the applicable procedures specified in Reference Residential Appendix RA3.3.
    - i. 0.45 W/CFM for gas furnace air-handling units.

ii. 0.58 W/CFM for air-handling units that are not gas furnaces.

- D. **Small duct high velocity forced air systems.** Demonstrate, in every control mode, airflow greater than or equal to 250 CFM per ton of nominal cooling capacity through the return grilles, and an air-handling unit fan efficacy less than or equal to 0.62 W/CFM as confirmed by field verification and diagnostic testing in accordance with the procedures given in Reference Residential Appendix RA3.3.

**Exception 1 to Section 150.0(m)13B and D:** Standard ducted systems (without zoning dampers) may comply by meeting the applicable requirements in Table 150.0-B or 150.0-C as confirmed by field verification and diagnostic testing in accordance with the procedures in Reference Residential Appendix Sections RA3.1.4.4 and RA3.1.4.5. The design clean-filter pressure drop requirements specified by Section 150.0(m)12Div for the system air filter(s) shall conform to the requirements given in Tables 150.0-B and 150.0-C.

**Exception 2 to Section 150.0(m)13B and D:** Multispeed compressor systems or variable speed compressor systems shall verify air flow (cfm/ton) and fan efficacy (Watt/cfm) for system operation at the maximum compressor speed and the maximum air handler fan speed.

**Exception 3 to Section 150.0(m)13B:** Gas furnace air-handling units manufactured prior to July 3, 2019 shall comply with a fan efficacy value less than or equal to 0.58 w/cfm as confirmed by field verification and diagnostic testing in accordance with the procedures given in Reference Residential Appendix RA3.3.

**Exception 1 to Section 150.0(m)13C:** Multispeed or variable speed compressor systems, or single speed compressor systems that utilize the performance compliance approach, shall demonstrate compliance with the airflow (cfm/ton) and fan efficacy (Watt/cfm) requirements of Section 150.0(m)13C by operating the system at maximum compressor capacity and system fan speed with all zones calling for conditioning, rather than in every zonal control mode.

**Exception 2 to Section 150.0(m)13C:** Gas furnace air-handling units manufactured prior to July 3, 2019 shall comply with a fan efficacy value less than or equal to 0.58 w/cfm as confirmed by field verification and diagnostic testing in accordance with the procedures given in Reference Residential Appendix RA3.3.

(n) **Water heating system.**

1. Systems using gas or propane water heaters to serve individual dwelling units shall designate a space at least 2.5 feet by 2.5 feet wide and 7 feet tall suitable for the future installation of a heat pump water heater (HPWH) by meeting either A or B below. All electrical components shall be installed in accordance with the *California Electrical Code*:
  - A. If the designated space is within 3 feet from the water heater, then this space shall include the following:
    - i. A dedicated 125 volt, 20 amp electrical receptacle that is connected to the electric panel with a 120/240 volt 3 conductor, 10 AWG copper branch circuit, within 3 feet from the water heater and accessible to the water heater with no obstructions; and
    - ii. Both ends of the unused conductor shall be labeled with the word “spare” and be electrically isolated; and
    - iii. A reserved single pole circuit breaker space in the electrical panel adjacent to the circuit breaker for the branch circuit in A above and labeled with the words “Future 240V Use”; and
    - iv. A condensate drain that is no more than 2 inches higher than the base of the installed water heater, and allows natural draining without pump assistance.
  - B. If the designated space is more than 3 feet from the water heater, then this space shall include the following: