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California Energy Commission

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TO: Mazi Shirakh, P.E (California Energy Commission)
Cc: Dan O'Donnell (Director), Samantha Omev (VP Government Relations), Kevin Graebel (Product Manager)

RE: 2013 Building Energy Efficiency Standards (California Code of Regulations, Title 24, Parts 1 and 6). §150.0(m)12: Air Filtration

Dear Mazi,

I would like to provide you with feedback regarding the proposed 2013 Building Energy Efficiency Standard.

Regarding category (m) "Air Distribution and Ventilation System Ducts, Plenums, and fans" item 12 refers to "Air Filtration", there are several components of this standard that are harmful to the homeowner, create unintended HVAC system inefficiency, and promotes unfair competition in the air filtration market.

The relevant sections are stated as follows.

- **B. Efficiency.** All systems that are required to meet the specifications given in Section 150.0(m)12A shall be provided with air filters having a minimum efficiency rating of MERV 6 as determined in accordance with ASHRAE Standard 52.2, or a minimum particle size efficiency of 50% in the 3.0–10 µm range as determined in accordance with AHRI Standard 680.
- **C. Pressure Drop.** All systems that are required to meet the specifications given in Section 150.0(m)12A shall be provided with air filters that perform at a maximum clean filter pressure drop of 25 Pa (0.1 inches water), as rated using AHRI Standard 680, for the applicable system design airflow.
- **D. Air Filter Product Labeling.** Air filter products shall be labeled by the manufacturer to disclose the AHRI Standard 680 performance ratings for airflow rate, initial and final resistance (pressure drop), dust holding capacity, and particle size efficiency for three particle size ranges: 0.30 µm to 1.0 µm, 1.0 µm to 3.0 µm, and 3.0 µm to 10 µm.

It is admirable that the efficiency be defined with a minimum MERV rating of 6. This type of filter will at least provide a basic level of protection to the equipment, and will provide minor improvements to the level of indoor air quality. However, requirement "C" as listed, with a maximum clean filter pressure drop of 0.1" H₂O, will may actually reduce the overall system efficiency because it does not address system pressure as the filter gets loaded (dirty). As proposed, it limits HVAC Dealers who design low pressure drop systems in order to incorporate a high MERV filter, and it gives an advantage to high particle efficiency (high pressure drop) filters sold in retail that will not be subject to the same regulations.

Dust holding capacity at a specified pressure drop that is indicative of a loaded filter is a better indicator of the overall impact to system performance/efficiency. The AHRI standard defines the dust holding capacity at the amount of dust held when the pressure drop is 0.5" H₂O. However, the new regulation as proposed only requires the dust holding capacity to be listed on the label in (grams), and does not require a minimum capacity requirement at a specified loaded pressure. Since most homeowners will not understand how much a gram of dust represents, the proposed regulation would encourage filter manufacturers to design their products to have low initial pressure drop

but to use a cheap construction that loads very quickly which would lead to greater system inefficiency. Here is a hypothetical example.

Filter A

- Initial pressure drop – 0.2” H2O
- Dust Holding Capacity at 0.5” H2O – 70 grams

Filter B

- Initial pressure drop – 0.09” H2O
- Dust holding capacity at 0.5” H2O – 5 grams

In this case, only Filter B would meet the proposed standard. However, it will reach a pressure drop of 0.5” H2O at 5 grams, which might be 1-2 months of regular use. If the homeowner was not consistent about changing the filter (most are not), Filter B would be significantly more likely to cause problems with the system and reduce overall energy efficiency. In addition to these differences, Filter A would likely have a much higher MERV rating that causes its higher initial pressure drop. This modified proposal would provide better overall system efficiency as well as better air quality to homeowners.

I recommend that the standard take the following approaches.

- Remove the requirement for initial pressure drop while maintaining the listing requirement so contractors can design their systems with this in mind
- Add a new requirement for minimum dust holding capacity of 35 grams at 0.5” H2O. This will require the use of filters that provide less pressure drop over the full life of the filter and thus improving the overall efficiency of the HVAC system (rather than only temporarily/initially improving the system efficiency).

Finally, the standard as originally proposed promotes unfair competition in the marketplace between retail and professionally installed systems. This also results in less efficient systems. All MERV 10+ filters are likely to be higher than 0.1” H2O initial pressure drop however they would still be available to homeowners in retail stores. This is likely to result in HVAC dealers instructing homeowners to purchase a retail filter (that reduces overall system inefficiency) in order to improve their air quality. With the modification to the proposal, dealers (and manufacturers) would promote filters that provide better system efficiency and improved air quality.

Regards,
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