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*Comment Received From: Jacob Casady  
Submitted On: 11/17/2020  
Docket Number: 19-BSTD-03*

**Please see AHAM's comments on Staff Workshop on Ventilation for Indoor Air Quality and Reduced Infiltration Proposals**

*Additional submitted attachment is included below.*



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November 17, 2020

Peter Strait  
Supervisor, Building Standards Development  
California Energy Commission  
Docket Unit, MS-4  
Docket No. 19-BSTD-03  
1516 Ninth Street  
Sacramento, California 95814-5512

via Email: [peter.strait@energy.ca.gov](mailto:peter.strait@energy.ca.gov)  
cc: [info@title24stakeholders.com](mailto:info@title24stakeholders.com)

Re: Staff Workshop on Ventilation for Indoor Air Quality and Reduced Infiltration Proposals

Dear Mr. Strait:

The Association of Home Appliance Manufacturers (AHAM) writes to comment on the *Staff Workshop on Ventilation for Indoor Air Quality and Reduced Infiltration Proposals*. AHAM represents manufacturers of major, portable, and floor care home appliances, and suppliers to the industry. AHAM's membership includes over 150 companies throughout the world. In the U.S., AHAM members support more than one million jobs, have a \$198 billion economic impact, and produce more than 95% of the household appliances shipped for sale. In California, the home appliance industry is a significant and critical segment of the economy. The total economic impact of the home appliance industry to California is \$15.9 billion, more than 30,000 direct jobs and an additional 53,000 indirect jobs, \$2.4 billion in state tax revenue and more than \$5 billion in wages. The home appliance industry, through its products and innovation, is essential to U.S. consumer lifestyle, health, safety and convenience. Through its technology, employees and productivity, the industry contributes significantly to U.S. jobs and economic security. Home appliances also are a success story in terms of energy efficiency and environmental protection. New appliances often represent the most effective choice a consumer can make to reduce home energy use and costs.

As AHAM stated in its October 16, 2020 comments to this docket, indoor cooking, its ventilation and the quality of air in homes are important issues to AHAM. Indeed, home appliance manufacturers have long sold products to exhaust cooking byproducts and ensure that all cooking appliances sold meet exacting safety standards. In addition, the home appliance industry manufactures other products that help treat and improve air quality in our homes, such

as air cleaners, vacuums, and air conditioning and circulation products such as window and portable air conditioners, humidifiers, and dehumidifiers.

## NO<sub>2</sub> Standard Concerns

As an initial matter, CEC appears to be using inappropriate data regarding nitrogen dioxide (NO<sub>2</sub>) exposure risk. AHAM urges the CEC to use sound science and data that is based on credible public health criteria. The RMI study, which CEC relies on, uses peak values, which is improper. CEC should rely on the conclusions of unbiased public health experts at US EPA, CARB, and Health Canada. These agencies have completed comprehensive work on health- and exposure-related science for NO<sub>2</sub>. These agencies rely on standards and exposure limits that are based on averages and not peak values. CEC is not a public health agency and it should not contradict the work of public health officials – it too should rely on averages and not peak values in assessing NO<sub>2</sub> risk.

For example, CARB’s position on NO<sub>2</sub> risk uses 1-hour and annual averages:

*Ambient air quality standards define the maximum amount of pollutant that can be present in outdoor air without harming human health. In 2007, after an extensive review of the scientific literature, the Board lowered the state one-hour standard for NO<sub>2</sub> to 0.18 ppm and retained the annual average standard of 0.030 ppm based on evidence for adverse health effects at the level of the existing one-hour standard. The national standard was more recently revised in 2010 following an exhaustive review of new literature pointed to evidence for adverse effects in asthmatics at lower NO<sub>2</sub> concentrations than the existing national standard.<sup>1</sup>*

	1-Hour Average	Annual Average
<b>National Ambient Air Quality Standard</b>	0.100 ppm*	0.053 ppm
<b>California Ambient Air Quality Standard</b>	0.18 ppm	0.030 ppm

\* The official level of the 1-hour NO<sub>2</sub> standard is 100 ppb, equal to 0.100ppm, which is shown here for the purpose of clearer comparison to the other standards.

Similarly, Health Canada has extensively reviewed the issue of risk associated with NO<sub>2</sub> exposure:

*The health effects of NO<sub>2</sub> have been extensively examined in a very large number of studies, including epidemiological studies of health effects associated with NO<sub>2</sub>, controlled human exposure studies in volunteers exposed to NO<sub>2</sub> in experimental chamber studies, and toxicology studies of animals exposed to NO<sub>2</sub> in the laboratory.<sup>2</sup>*

<sup>1</sup> California Air Resources Board, <https://ww2.arb.ca.gov/resources/nitrogen-dioxide-and-health>, last visited on October 6, 2020.

<sup>2</sup> Health Canada, <https://www.canada.ca/en/health-canada/services/publications/healthy-living/human-health-risk-assessment-ambient-nitrogen-dioxide.html>, last visited on October 6, 2020.

As a result of its research into NO<sub>2</sub>, Health Canada also uses a 1-hour average for its standard of 90 ppb for indoor exposure, which is similar to EPA's 1-hour average standard of 100 ppb for outdoor air.

The RMI study's use of peak NO<sub>2</sub> levels to determine performance requirements are out of step with national experts and California's own air quality experts. CEC should follow CARB's lead and ensure its decision making process is based on reliable scientific evidence on this issue.

### **CEC Staff Workshop Questions**

AHAM provides the following responses to the CEC Staff Workshop Questions.

*Q: Keeping in mind that research has determined the proposed values for CE and airflow are necessary to protect the health of dwelling occupants, should CEC nevertheless consider temporary reductions of the CE or airflow compliance targets to help the range hood industry transition to more efficient range hood designs?*

AHAM supports the development of a capture efficiency (CE) metric for range hoods, and to that end, is putting substantial effort toward ensuring the development of a repeatable, reproducible and appropriately validated capture efficiency test procedure. However, no such repeatable and reproducible test procedure exists to date. Indeed, Section 11 of ASTM E-3087-18, the test procedure on which CEC proposes to base a CE regulation, specifically notes that reproducibility and repeatability of the procedure has not been validated. Perhaps more strikingly, CASE's own testing demonstrates profound issues with the reliability of ASTM E-3087-18. Without a repeatable, reproducible test procedure, any regulatory targets for capture efficiency become at best meaningless and at worst, destructive to CEC's and the industry's goals of capture efficiency as a primary metric for evaluating range hoods and setting meaningful energy consumption standards for the product class.

It is important to note that AHAM's significant concerns with the proposed capture efficiency metric and test procedure are not mere feet dragging. AHAM has and continues to actively contribute to the development of a repeatable and reliable test procedure – spending money, time, and effort to move this process forward. For instance, AHAM and the American Gas Association (AGA) are researching current production gas range products to produce up-to-date data that can be used to generate more reliable simulations. Until such data exists, along with further understanding of the validation (and therefore reliability) of simulations, simulations such as those in the 2020 LBNL paper, are insufficient to set regulatory targets, let alone to consider a temporary “reduction” from such targets.

As to the targets proposed by CEC, the proposal of 280 cfm is far too high. The LBNL simulations used to determine the proposed limit are not just unreliable, they are overly conservative. The targets are based on worst case results, a proximity factor, and older generation cooktops (so old they include pilot lights). Perhaps more importantly, given the lack of reliability of the ASTM E-3087-18 test procedure, on which the internal LBNL CE method is loosely based, the correlation between capture efficiency and airflow is even less reliable for purpose of establishing mandatory regulations. Again, AHAM encourages CEC to base rule-

makings on sound science, best practices and acceptable statistical confidence levels. CEC should not engage in regulatory rule-making on such limited and questionable evidence.

Determining appropriate regulatory requirements for range hoods over a gas range should be based on actual test data from current construction ranges and range hoods as well as credible health criteria. Until that data exists, the appropriate course is for CEC to set gas and electric airflow requirements (CFM) at the same level and to base that level on particulate matter removal. The current level in Title 24 is 100 cfm, so even if that is doubled, it would be 200 cfm. Frankly, this level remains unfounded, as does any level selected by CEC, due to the lack of sufficient evidence of an appropriate airflow or capture efficiency. Nonetheless, this is a level that increases airflow requirements without sacrificing consumer choice or driving increased consumer cost.

Regarding ASTM E-3087-18 and its establishment of a capture efficiency test procedure, ASHRAE 62.2-2019 has not included this test procedure and if a metric based on this test procedure is included in CEC's 2022 Title 24, it should only be included as an option for the 2022 CEC energy code. As previously discussed above, the test procedure is unreliable – it lacks proven repeatability and reproducibility – the bedrock of any regulatory scheme. Further, the test costs for capture efficiency are currently 8 to 10 times the cost of an airflow test and should be conducted at the Nominal Airflow rate, which is not yet defined. All of this cost would likely be carried on to the consumer, and for little benefit given the lack of reliability. Moreover, there is only one lab that has the capability to conduct this test and CASE's own research shows that the issues with repeatability in ASTM E-3087-18 occur in identical tests run just in that one lab, let alone between different labs. The IEC is also working on capture efficiency, and by 2025, there should be an international method that is harmonized with a North America consensus standard and shown to be repeatable and reproducible. Additionally, AHAM recommends that an optional CFM correlation to CE for ratings still exist in 2025 in order to allow for management of end of life product costs.

*Q: Should range hoods have lower sound levels at the higher airflow rates necessary for adequate CE?*

AHAM appreciates CEC's consideration of how noise impacts consumer use of range hoods. This is a complex issue as the operating conditions for range hoods are unique due to the heat and cooking byproducts that limit the ability to use common sound deadening materials and designs. Ultimately, cost and efficiency must be considered to achieve the needed balance between CE and fan noise. There is also a direct correlation between the airflow rate and the energy required to operate fans contained within ventilation hoods. CEC should consider the energy required to operate the fan as a factor in these requirements and the potentially negative energy consumption consequences of establishing higher operating conditions.

ASHRAE 62.2 -2019 clause 7.2 does not allow "working speed" and a definition for or use of working speed has not been added to ASHRAE 62.2. The decision by CEC to promote testing at working speed conflicts with ASHRAE and has slowed ASHRAE's efforts in this area because of the need to generate ratings at this condition as installed when testing is not possible due to background noise. Companies have had to divert resources from lab testing of future design ideas as well as testing to support a reliable capture efficiency test to show they are compliant to CEC-2019, which is an arbitrary low-end target. The CEC requirement is not useful nor helpful

to consumers because the main issue with why consumers do not use a range hood is due to noise produced at the higher speeds. Working speed noise levels have not shown to correlate with noise at higher speeds. AHAM supports reviewing the requirement on the noise a range hood produces, but it needs to be done the right way and there should be no changes until 2025 to allow this work to be done correctly.

*Q: Should range hoods turn on and off automatically in response to pollution emittance from a cooktop?*

No. Safe operation of a cooktop is vital to protecting both human health and property. To the extent this question suggests a new requirement that cooking range hoods operate automatically, it is important to note the unintended safety and other consequences that would present. CEC should recognize that, for safety reasons, creating a “continuous mode” for range hoods would classify the range hood as an unattended appliance, which may require new safety standard requirements for this operation. Moreover, this requirement would reduce consumer utility, especially for cooking modes that require little or no ventilation. Additionally, automatically turning on a range hood has the potential to delay the operation of smoke detectors if the range hood is not tied to the actual operation of the cooktop. Other sources of fire could also activate the exhaust and draw fresh air to a fire before the operation of the smoke detector. UL is establishing a working group to look at current and future range hood safety standards. Also, note that the California Fire Marshalls will not allow use of continuous mode technology until the safety standard updates have been made.

*Q: Should makeup air be provided in kitchens when range hoods are operating?*

A requirement for make-up air in kitchens when range hoods are operating is unnecessary due to existing ASHRAE standards that do not require make-up air for range hoods that operate below 400 CFM ventilation. CEC should not adopt standards that have not been approved through a consensus process. This would include Nominal Installed Flow in HVI 920-2020 and Capture Efficiency as defined in HVI 917. The ASHRAE Range Hood Metrics Working Group (RHMWG) was not a consensus process. It only was conceptual and directional, and then the group disbanded. The SSPC 62.2 group has been recreated to fully consider the concepts generated by the RHMWG and to make them executable. Nominal Installed Flow is not ready for ASHRAE 62.2, and therefore not ready for CEC to make a Title 24 requirement. Accepting CE at lower pressures establishes a false operating condition and would result in a significant test burden and workload through one laboratory that has not yet developed a reliable method.

With the tragic wild fire season in California, it is a good reminder that homes are becoming “tighter” to keep out the smoke. However, this has two implications on ventilation. First, a tighter home raises the backpressure. Second, there is a need for an optional recirculation mode to reduce outdoor smoke from entering the home during a wildfire event.

## **Conclusion**


CEC has put itself in a position of being too far out in front of the science needed to support its regulatory agenda. In order to set a capture efficiency requirement, CEC first needs a reliable test for capture efficiency: one that produces consistent results from test to test and lab to lab. No such procedure exists. The test proposed by CEC, ASTM E-3087-18, acknowledges in its

own text that its reproducibility and repeatability have not been validated. Moreover, CASE's own testing shows that the test is unreliable. Without a reliable measure of capture efficiency, no meaningful regulatory requirement can be set – either for CE or airflow. Further, without a consistent as-installed criteria for setting regulatory requirements, such as a reliable Nominal Installed Flow, any further regulatory action by CEC on these issues is premature, will be ineffective, and may slow or confound CEC's stated goals.

In addition to the issues with proposed airflow and CE regulations, CEC regulation of range hoods should be neutral as to the energy source used by the cooking appliance. The indoor air quality impacts of cooking are largely the same regardless of energy source associated with the cooking appliance. If separate requirements are considered for different energy sources, they should be determined based on credible data from testing of the energy source in real world scenarios. And, requirements should be considered, if at all, based on only on reductions necessary to achieve levels consistent with recognized public health indoor air quality standards. More research and testing on the current production of gas cooking products is needed before establishing significantly higher airflow limits that may be overly conservative and will reduce consumer use of the range hood due to noise.

AHAM appreciates the opportunity to comment on this pre-rulemaking proceeding. We understand and appreciate CEC's stated commitment and willingness to address this matter and look forward to continuing to work with CEC to resolve it.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jacob Cassady', written in a cursive style.

Jacob Cassady  
Director, Government Relations