



APPLIANCE STANDARDS
AWARENESS PROJECT



NYSERDA

December 19, 2022

By E-mail

Ms. Ashley Armstrong
Senior Advisor / Director Regulatory Programs Buildings
Department of Energy
Building Technologies Program
Mailstop EE-5B
1000 Independence Avenue, SW
Washington, DC 20585-0121

AirCleaners2021TP0036@ee.doe.gov

Re: Joint Comments On DOE’s Notice Of Proposed Rulemaking On The Test
Procedure For Air Cleaners; Docket No. EERE-2021-BT-TP-0036; RIN 1904-AF26

Dear Ms. Armstrong:

The American Council for an Energy-Efficient Economy (ACEEE), the Appliance Standards Awareness Project (ASAP), the Association of Home Appliance Manufacturers (AHAM), Consumer Federation of America (CFA), the Natural Resources Defense Council (NRDC), and the New York State Energy Research and Development Authority (NYSERDA) (collectively, the Joint Commenters) respectfully submit the following comments to the Department of Energy (DOE or Department) on its Notice of Proposed Rulemaking on The Test Procedure For Air Cleaners; EERE-2021-BT-TP-0036; RIN 1904-AF26; 87 Fed. Reg. 63324 (Oct. 18, 2022).

The Joint Commenters, which represent varying points of view, are unified in our support for DOE’s efforts to save energy and ensure a national marketplace through the Appliance Standards Program. To this end, on August 23, 2022, we submitted for DOE’s consideration a Joint Statement of Joint Stakeholder Proposal On Recommended Energy Conservation Standards And Test Procedure For Consumer Room Air Cleaners (Joint Proposal).

Central to our agreement are the proposed timelines for compliance. In our Joint Proposal, we asked DOE to publish final rules adopting the consumer air cleaner test procedure and standards as soon as possible, and no later than December 31, 2022. We stated that if DOE does not meet that deadline, each of the Joint Stakeholders (AHAM, ASAP, ACEEE, CFA, NRDC, NYSERDA, and Pacific Gas and Electric Company (PG&E)) reserve the right to rescind support for the standards and compliance dates in the Joint Proposal. In the Joint Proposal, the parties to

the agreement urged DOE to adopt in full AHAM AC-7-2022 as the test procedure or to use the text of the final draft version of that test as the basis for the Federal test procedure. We also requested that certain sections of ANSI/AHAM AC-1-2020 for dust and smoke CADR be permitted as an alternative for the purposes of calculating PM_{2.5} CADR in AHAM AC-7-2022. Moreover, the parties to the Joint Proposal urged DOE to rely upon the exception in section 8(d)(2)(ii) of the Process Rule to quickly finalize the test procedure and eliminate the time between the finalization of the test procedure and the end of the comment period on (or even the issuance of) a direct final rule on energy conservation standards for consumer room air cleaners provided that both the test procedure and standards are consistent with the recommendations in the Joint Proposal.

Repeatable and reproducible test procedures that are representative of actual consumer use, but not unduly burdensome to conduct, are an integral part of the standards program. The Joint Commenters are united in their view that AHAM AC-7-2022 satisfies ECPA's criteria in 42 U.S.C. 6293(b)(2). As outlined in the Joint Proposal, it is reasonably designed to produce test results that measure energy efficiency of consumer room air cleaners during a representative average use cycle and is not unduly burdensome to conduct. Thus, as a general matter, we support DOE's proposed test procedure which is largely consistent with AHAM AC-7-2022. DOE did not, however, propose a test procedure identical to AHAM AC-7-2022 and the Joint Commenters provide comments below on DOE's proposed deviations and more minor technical differences.

DOE proposed to adopt the substantive provisions of AHAM AC-7-2022 in its final draft form with some modifications and sought comment on this proposal. The Joint Commenters fully support adoption of AHAM AC-7-2022, which has now been published, as the DOE test procedure. We note that there are a couple of minor differences in the instrumentation provisions from the draft which were described during the November 9, 2022 public meeting to discuss DOE's proposed test procedure and are described more fully below. These minor differences are known to other stakeholders and should not prevent DOE from adopting the final, published version of AC-7. With regard to DOE's proposed modifications, we comment on each of them below.

DOE also requests comment on its proposal to incorporate by reference AHAM AC-1-2020 which is referenced in AHAM AC-7. The Joint Commenters support that reference because, though an updated version of AC-1 is in process, it will not be completed in time for DOE to meet the quick timelines in the Joint Proposal.

I. DOE Should Consider Joint Commenters' Views On Issues Not Expressly Raised In The Joint Proposal.

The Joint Commenters are largely supportive of DOE's proposed test procedure and we strongly urge DOE to finalize the test procedure quickly. There are a few proposals that go beyond the scope of AHAM AC-7-2022 and our Joint Proposal. The following comments detail our perspective on those proposals.

A. A Pollen CADR/W Metric Is Not Necessary.

DOE indicated that it is considering including an additional test to determine pollen CADR. Although we are not jointly commenting on the proposed test for measuring pollen CADR, the Joint Commenters note that we do not believe a pollen CADR/W metric is necessary because we did not propose a standard based on pollen.

B. DOE And FTC Should Coordinate On Room Size.

DOE proposes to include a calculation for representation of room size, in square feet. DOE's proposal is to align with ANSI/AHAM AC-1-2020 to specify that the effective room size be calculated from smoke CADR. But DOE also sought comment on if it should consider using a PM_{2.5} CADR value instead.

The Joint Commenters see value in communicating room size to consumers via a uniform test method, ANSI/AHAM AC-1-2020. We urge DOE and the Federal Trade Commission (FTC) to coordinate on the best way to do this. The Joint Commenters suggest that the recommended room size appear on the EnergyGuide label and we ask that DOE and FTC determine the best way to accomplish that. Specifically, we are agnostic as to whether DOE or FTC specify the applicable test procedure. Regardless of the agency that specifies the test procedure, we urge DOE and FTC to rely upon the method in AHAM AC-1-2020. The recommended room size in square feet is calculated based on the removal of at least 80 percent of smoke particles in a steady-state room environment (assuming the room experiences incoming pollutants at the rate of one air change per hour) and with complete mixing in the room.

DOE and FTC should not consider using a PM_{2.5} CADR or other CADR value in place of the smoke CADR value used in the AHAM test method to determine the recommended room size. Room size should not be based on PM_{2.5} CADR because the PM_{2.5} CADR is not measured directly; it is the geometric average of smoke CADR and dust CADR. The engineering tobacco smoke was chosen because it is a common global indoor pollutant and it has an extremely small size. ANSI/AHAM AC-1-2020 uses a specific engineering tobacco smoke to generate the smoke CADR. The size of the smoke particles are 100 to 1000 times smaller than the width of a human hair. Therefore, even if a consumer does not smoke, engineering tobacco smoke is a surrogate for many of the fine particles that may be found in a home including contributions from room sources and infiltration of air from outside as well as other rooms connected to the one where the air cleaner is in use.

A standard first-order differential equation that includes these contributions is utilized for the calculation, and that is summarized as:

$$\begin{aligned}\text{Room Size (square feet – ft}^2\text{)} &= \text{cigarette smoke CADR} \times 1.55 \\ \text{Room Size (square meters – m}^2\text{)} &= \text{Room Size (ft}^2\text{)} \times 0.093\end{aligned}$$

The maximum allowable CADR that can be measured by the ANSI/AHAM AC-1-2020 method in the chamber is 600, so the maximum room size that the standard can confidently predict performance would be a room of 930 ft² (86.4 m²). For modeling of suggested room size,

AHAM assumes a room height of 8 feet and the air cleaner producing 4.8 air changes per hour of cleaned air. This relationship between cleaning rate in CADR and room size to clean to the 80 percent level has been verified by scientists at the National Institute of Standards and Technology (NIST) and recognized as reasonable by the U.S. Federal Trade Commission. Accordingly, we strongly urge DOE and/or FTC to retain reliance on smoke CADR to determine recommended room size.

C. Sampling and Rounding

DOE proposes that CADR values of a basic model be calculated as the mean of the CADR for each tested unit of the basic model, rounded to the nearest whole number. DOE further proposes that AEC be rounded to the nearest 0.1 kWh/year and the IEF be rounded to the nearest 0.1 CADR/W. Although ANSI/AHAM AC-1-2020 does not specify rounding for AEC, it does address rounding of CADR and room size to whole numbers. If CADR is rounded to a whole number, the Joint Stakeholders recommend that DOE similarly specify rounding of AEC to the nearest whole number for consistency.

D. Other Standards

DOE states that it is still evaluating various standards, including ANSI/AHAM AC-5 which focuses on reduction of microbiologicals and ANSI/AHAM AC-4 which focuses on gases. Although DOE is not proposing any requirements from these or other standards at this time, it indicates that it is still evaluating test methods for gaseous and microorganism contaminants and will consider these standards for gaseous and/or microorganism testing. DOE stated that though it is not proposing provisions to measure the efficacy of an air cleaner's removal of microorganisms, it welcomes comment on the impact the type of microorganism selected for testing has on the CADR for microbes, among other questions.

The Joint Commenters agree that DOE should not at this time prescribe a test for gases or microbiologicals. A metric for those is not necessary at this time as we have not proposed standards based on them. AHAM notes that DOE was part of the AC-5 task force. If DOE has specific questions on that methodology AHAM encourages DOE and/or Guidehouse to request the Task Force be convened to discuss these technical matters and AHAM will be glad to oblige. As the test is brand new (published in March 2022), there is still very little test data at this time as compared to PM_{2.5} CADR based on smoke and dust which have been in use since the late 1980s.

II. DOE's Proposed Clarity In Some Provisions Is Helpful.

DOE requested comment on potential improvements to the test procedure regarding an alternate to tobacco smoke and clarifying provisions on unit placement. We provide our responses below and urge DOE to incorporate this feedback as it quickly finalizes the test procedure in accordance with our recommendations on timing for a final test procedure and energy conservation standard.

A. Use Of Potassium Chloride As An Alternate To Engineered Tobacco Smoke

DOE indicated that it is considering whether it should include reference to the use of potassium chloride (KCl) as an alternative to cigarette smoke, as specified in a draft of AHAM AC-7-2022. The Joint Commenters support the concept of adding KCl as an alternate to smoke as it is noted in AHAM AC-7. But, AHAM-AC-1-2022 will not be published by the end of the year. The KCl specification in AHAM AC-1-2022 will be defined completely so that it is an acceptable smoke alternative. Specifically, it will include the acceptable KCl particle size distribution, proper aerosolizer specifications, and initial concentration of the KCl particle. At this time, however, there are too many open questions to specify KCl as an alternative because there is not sufficient testing knowledge. AHAM plans to do the required testing. Specifically, a round robin test to assure reproducibility with the new KCl equipment with the approved labs needs to be completed before the standard can be released. Unfortunately, this will not be completed quickly enough to allow DOE to include KCl as an alternative in a final test procedure that can be completed by the timeline in the Joint Proposal. Accordingly, we recommend DOE forgo specifying KCl as an alternative to cigarette smoke until AC-1 has been updated to include those specifications. At that time, we hope that DOE will consider either amending the test procedure or providing guidance allowing use of the alternative.

B. Unit Placement

To address several of DOE's requests for comments on unit placement and Section 4.6 of AHAM AC-1-2020, AHAM published an Interpretation to AHAM AC-1 on October 3, 2022 that addressed DOE's questions: 1) whether to include additional test unit placement requirements; 2) whether to include a requirement for air cleaners shipped with casters; and 3) whether to specify placement of the air cleaner if placement is not specified by the manufacturer and the air cleaner's height is less than 28 inches). That interpretation is available in the copy of AHAM AC-1-2020 and is on the AHAM website. A published copy of ANSI/AHAM – AC-1-2020 with interpretation was provided to DOE on November 14, 2022 and the interpretation that is posted on the AHAM website is attached as Exhibit A. We urge DOE to adopt the interpretation as part of its incorporation by reference.

III. DOE Should Consider Joint Commenters' Views On Remaining Technical Issues.

The Joint Commenters appreciate DOE's careful consideration of the test procedure and provide our views below on the remaining of DOE's requests for comment. We urge DOE to adopt these views and move quickly to a final rule.

A. 48-Hour Burn-In Time For Air Cleaners With UV Lights

DOE requests comment on whether a 48 hour burn-in time for air cleaners with UV lights is sufficient or if the burn-in time duration should be increased. The Joint Commenters believe the 48-hour burn-in time is sufficient. As the lamps are not being used for smoke or dust removal, the run in time of 48 hours is the same as the other components and does not add additional burden to the test set-up.

B. Network Connection Requirements During Active And Standby Mode Tests

DOE seeks comment on its proposal to reference section 3.6.3 of AHAM AC-7-2022 regarding network connection requirements. This provision, driven by laboratory input, is based on how the test has historically been conducted, including for ENERGY STAR testing. We believe the text of 3.6.3 provides the most consistent, representative, and repeatable method for energy measurements and support DOE's proposal to reference it in the DOE test procedure.

C. Software Updates

DOE requests comment on whether the software update requirements are adequately specified or whether DOE should expressly state that software updates must always be executed prior to running the tests. The intent of AHAM AC-7 section 3.6.3.8 is that these software updates be conducted and that is industry practice. If DOE wishes to indicate that the updates must be run (rather than AC-7's current language that they should be run), the Joint Commenters do not oppose that clarity.

D. Instrumentation Requirements

DOE requests comment on its proposal to incorporate by reference Section 4 of AHAM AC-7-2022 Draft regarding instrumentation requirements. Should the final standard change any of these requirements, DOE requests comment on the changes, the reasons for them, and the impact of the changes on the overall air cleaner test procedure.

The published version of AHAM AC-7-2022 does include two editorial changes from the public final draft. The changes are in 4.1.5, which added the C° temperature, and the RH accuracy was improved in 4.1.6. We believe these editorial changes clarify the test and will improve accuracy. AHAM reviewed these changes during the November 9, 2022 public meeting to discuss the proposed test procedure and there appeared to be support for the changes to more accurately specify the RH accuracy range.

E. Alternative Use Of Smoke CADR And Dust CADR Calculated According To Sections 5 And 6 Of AHAM AC-1-2020

Given the historic use of both smoke and dust particulates to define a metric for air cleaners, as well as the range of particle sizes covered by the smoke and dust test, DOE proposes to incorporate by reference Section 2.9 of AHAM AC-7-2022 to specify testing with smoke and dust CADR as calculated according to Sections 5 and 6 of AHAM AC-1-2020. Additionally, DOE proposes to reference those sections for conducting the smoke CADR and dust CADR tests. DOE requests feedback on its proposal to incorporate by reference Section 2.9 of AHAM AC-7-2022 to calculate PM_{2.5} CADR based on measurements of smoke and dust CADRs. DOE also requests comment on its proposal to allow the use of smoke and dust CADRs calculated according to sections 5 and 6 of AHAM AC-1-2020.

In order to ensure that, given the expedited compliance date of one year after a date of publication in the Federal Register for the recommended standards in tier one of our Joint

Proposal, assuming DOE publishes the final rule on December 31, 2022, the Joint Commenters agree that DOE should permit Section 5 and 6 of ANSI/AHAM AC-1-2020 for smoke and dust CADR to be applied in the calculation of PM_{2.5} CADR in AHAM AC-7-2022 for the tier one standards. Many products have already been tested per ANSI/AHAM AC-1-2020 but the data was not truncated for a PM_{2.5} CADR per Annex I. The smoke and dust CADRs in Section 5 and 6 are nearly identical to the subsets used to calculate the PM_{2.5} CADR, as shown in Annex I. Allowing this alternative for tier one will ensure that manufacturers are not required to re-test using AHAM AC-1-2020 Annex I to demonstrate compliance with a new standard on such a short timeline and can, thus, meet the quicker compliance date.

Additionally, as the results are essentially identical, the Joint Commenters do not object to this alternative also applying to the second tier of standards in our Joint Proposal.

F. Measuring Active Mode Power At The Same Time As Smoke Or Dust CADR

DOE requests comment on its proposal to reference Sections 5.7.1 through 5.7.4 of AHAM AC-7-2022, which specify methods for measuring active mode power at the same time as the smoke or dust CADR test when the test unit is operating within the chamber and measuring the power consumption during a supplemental power test outside of a test chamber, respectively. The Joint Commenters agree with DOE's proposal. Investigative testing AHAM conducted showed a -0.2 % difference between the two methods, which aligns with DOE's testing.

G. The Joint Proposal Has Broad Stakeholder Support

DOE requests comment on its initial determination of the costs for testing according to the proposed new air cleaner test procedure. DOE also requests comment on the potential impact to manufacturers from the proposed new air cleaner test procedure.

We note that the Joint Proposal was reviewed and supported by small and large manufacturers and achieved consensus by both types of manufacturers.

H. Coverage Of AC-1

The determination of Maximum CADR values is explained in the Informative Annex J of ANSI/AHAM-1. Products that perform beyond this level really need to be tested in a larger chamber for accurate assessment of their CADR. However, there are numerous technical aspects to fully define a repeatable and reproducible process for a larger chamber such as recirculation fans, unit placement, and if additional sampling ports are needed. These are currently under evaluation in an AHAM task force and also an IEC ad hoc working group. Once these issues are resolved there may be updates to ANSI/AHAM AC-1. We continue to support the 600 CADR limit for smoke and dust and do not recommend extending the test method at this time to units that have performance greater than 600 CADR for smoke and dust. We note that, as we stated in our Joint Proposal, our recommendations are restricted to consumer room air cleaners. Individual parties may have their own views on other products. These comments are specifically referencing the current scope of AHAM AC-1.

I. Auto Mode

It was mentioned during the November 9, 2022 public meeting that max speed does not represent all speed settings and automatic mode is not included.

There is no universally accepted way to test the speeds of all air cleaners and because “low” or “medium” in one air cleaner may be different from another, the test is performed on the maximum performance setting which would align with the highest continuous speed for the air cleaner plus other functions. Consumers can then make an informed selection based on the air cleaner’s highest performance level.

The AHAM standards committee, which includes DOE/Guidehouse, is working on “AHAM AC-7+” which is intended to develop a procedure to assess automatic mode. The Joint Commenters will consider this test for future consideration by DOE. But we believe it is worthwhile for DOE to proceed now with the currently available test methods in order to achieve national standards and energy savings immediately. As indicated in our Joint Proposal, so long as DOE acts quickly, we would not support DOE waiting to implement standards until an automatic mode test is developed.

IV. **The Joint Commenters**

ACEEE, a nonprofit research organization, develops transformative policies to reduce energy waste and combat climate change. With our independent analysis, we aim to build a vibrant and equitable economy – one that uses energy more productively, reduces costs, protects the environment, and promotes the health, safety, and well-being of everyone.

ASAP organizes and leads a broad-based coalition effort that works to advance, win, and defend new appliance, equipment, and lighting standards that cut emissions that contribute to climate change and other environmental and public health harms, save water, and reduce economic and environmental burdens for low- and moderate-income households.

AHAM represents more than 150 member companies that manufacture 90% of the major, portable and floor care appliances shipped for sale in the U.S. Home appliances are the heart of the home, and AHAM members provide safe, innovative, sustainable and efficient products that enhance consumers’ lives. The home appliance industry is a significant segment of the economy, measured by the contributions of home appliance manufacturers, wholesalers, and retailers to the U.S. economy. In all, the industry drives nearly \$200 billion in economic output throughout the U.S. and manufactures products with a factory shipment value of more than \$50 billion.

CFA is an association of more than 250 non-profit consumer and cooperative groups that was founded in 1968 to advance the consumer interest through research, advocacy, and education.

NRDC is an international nonprofit environmental organization with more than 3 million members and online activists. Since 1970, our lawyers, scientists, and other environmental specialists have worked to protect the world's natural resources, public health, and the

environment. NRDC has offices in New York City, Washington, D.C., Los Angeles, San Francisco, Chicago, Bozeman, MT, and Beijing.

NYSERDA is a public benefit corporation and offers information and analysis, innovative programs, technical expertise, and support to help New Yorkers increase energy efficiency, save money, use renewable energy, and reduce reliance on fossil fuels. NYSERDA's mission is to advance clean energy innovation and investments to combat climate change, improving the health, resiliency, and prosperity of New Yorkers and delivering benefits equitably to all. NYSERDA works to help implement New York State's nation-leading climate agenda, which is the most aggressive climate and clean energy initiative in the nation; New York is advancing an orderly and just transition to clean energy that creates jobs and continues fostering a green economy as our communities continue recovering from the COVID-19 pandemic.

The Joint Commenters appreciate the opportunity to submit these comments on DOE's proposed test procedure for air cleaners and would be glad to discuss these matters in more detail should you so request.

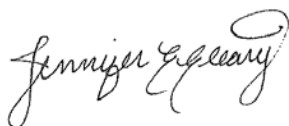
Respectfully Submitted,



Jennifer Amann
Senior Fellow
American Council for an Energy-Efficient Economy



Joanna Mauer
Technical Advocacy Manager
Appliance Standards Awareness Project



Jennifer Cleary
Vice President, Regulatory Affairs
Association of Home Appliance Manufacturers



Richard Eckman
Energy Policy Associate
Consumer Federation of America



Joe Vukovich
Energy Efficiency Advocate
Natural Resources Defense Council



Chris Corcoran
Team Lead – Codes, Products, & Standards
New York State Energy Research and Development Authority

Exhibit A



AHAM Standard Interpretation

1111 19th Street NW > Suite 402 > Washington, DC 20036
t 202.872.5955 f 202.872.9354 www.aham.org

Standard	ANSI/AHAM AC-1-2020 Method for Measuring Performance of Portable Household Electric Room Air Cleaners
Reasons for the Request	1. Clarity on unit location. 2. Harmonization with IEC 63086-1
Date Request Submitted	9/19/2022

1) Clarity on Unit Location

Background:

Subject: ANSI/AHAM AC-1-2020, Section 4.6

As AHAM AC-7-2022 was being developed, AHAM received the following request for clarification:

Currently Section 4.6.2 states:

Air cleaner is installed per manufacturer's instructions, placing the air cleaner (or test fixture containing the air cleaner) in the center of the test chamber, facing the test window, positioned with its air discharge as close as possible to the test chamber center. For air cleaners that discharge air in a specific direction, the air discharge shall not be pointed toward the particle monitors. If manufacturer's instructions do not specify (and air cleaner is not a floor model), place the air cleaner on the table for test.

It was noted that IEC 63086-1 has published with this Language

- Placement of an air cleaner not specified -

Where the placement of the air cleaner is not specified by the manufacturer, the DUT shall be classified according to its height. If the height of the DUT is less than 0,7 m from the floor, the DUT shall be placed on a table of 0,7 m in height. In all other cases, the DUT shall be placed on the floor of the test chamber.

Additionally, it was noted that a reference to casters in the product description indicate that it is to be treated as a floor model and that casters do not go on a table.

AHAM Standard Interpretation

AHAM Response:

AHAM would like to harmonize the language and revise as follows:

3.1.1 Air Cleaner - Floor Type *to state:*

Floor type air cleaners are designed to stand alone on the floor of a room and are designated as stand-alone floor models by the manufacturer. **Casters may or may not be present on the base of the unit.** Appliances of this type are tested on the floor facing the test window as close to the center of the test chamber as possible.

3.1.2 Air Cleaner - Table Type *to state:*

Table type air cleaners are designed to set on a table or counter by the manufacturer. **Casters will not be present of a unit defined for a table top.** Appliances of this type are tested on the table stand facing the test window at the center of the test chamber.

4.6.2 *to state:*

Air cleaner is installed per manufacturer's instructions, placing the air cleaner (or test fixture containing the air cleaner) in the center of the test chamber, facing the test window, positioned with its air discharge as close as possible to the test chamber center. For air cleaners that discharge air in a specific direction, the air discharge shall not be pointed toward the particle monitors. If manufacturer's instructions do not specify the placement of the air cleaner, **the air cleaner shall be classified according to its height with the presence of casters on the base of the unit.**

- **If the height of the air cleaner is less than 0.7 m (27.56 in.) from the floor and the unit does not have casters, air cleaner shall be placed on the table noted in Annex A.**
- **Otherwise, the air cleaner shall be placed on the floor of the test chamber.**