

What is the Clean Air Delivery Rate?

The Clean Air Delivery Rate, or CADR for short, of an air purifier is a numerical value assigned to an air purifier based on independent tests performed for the Association of Home Appliance Manufacturers (or AHAM). AHAM has been measuring the CADRs of air cleaners since the 1980s. According to the online encyclopedia Wikipedia, the CADR definition is *an indication of the volume of filtered air delivered by a portable air purifier*. It goes on to say that CADR describes how well the cleaner reduces tobacco smoke, pollen and dust. In other words, the CADR is an attempt to provide a uniform, objective standard by which potential buyers can easily evaluate the effectiveness of an air cleaner.

Given the potentially bewildering variety of air purifiers air available in the marketplace, such a standard is highly desirable. AHAM's own literature on CADR also emphasizes that CADR ratings are valid "regardless of the particle removal technology utilized," so it does not matter whether the purifier uses, for example, a HEPA filter or an ionizer. CADR measures only the end results.

How is CADR Determined?

An air cleaner is given a CADR through a relatively easy to understand process, which is called the ANSI/AHAM AC-1 standard which measures CADR requirements:

- The purifier is placed in a testing chamber of 1008 cubic feet.
- Before the purifier is activated, the amount of contaminants in the room is measured.
- The purifier is activated for a period of twenty minutes, during which time the amount of contaminants is periodically re-evaluated.
- Finally, the reduction in contaminants is compared to their natural rate of decay. When this test is over, testers proceed to give the unit its rating. The United States Environmental Protection Agency explains the number in the following way:

"The CADR is a measure of a portable air cleaner's delivery of contaminant-free air, expressed in cubic feet per minute. For example, if an air cleaner has a CADR of 250 for dust particles, it may reduce dust particle levels to the same concentration as would be achieved by adding 250 cubic feet of clean air each minute." - [Environmental Protection Agency](#)

AHAM's Three CADR Ratings

There are three CADR ratings given on the AHAM seal. These represent the air cleaners' effectiveness against three different common indoor air pollutants: tobacco smoke, pollen, and dust. AHAM recommends a "two thirds" rule when it comes to the first rating: "You'll always want a unit with a tobacco smoke CADR at least 2/3 your room's area."

Highest Possible CADR Ratings

Due to the fact that the tests always use the same room size, there is an upper limit to meaningful CADR ratings:

- Tobacco Smoke 10 to 450 CADR
- Dust 10 to 400 CADR
- Pollen 25 to 450 CADR

How Accurate and Useful are CADR Ratings?

As indicated above, CADR testing has a history of nearly 30 years, and in that time, its use has spread. Reputable organizations beyond the air purification industry have adopted CADR, including the [Environmental Protection Agency](#), the [Federal Trade Commission](#), and the independent watchdog organization Consumer Union.

There is no reason to believe that CADRs are not effective, within limits. Nonetheless, as always, a certain measure of caution is advisable.

Conclusion

- CADR is one tool to measure the effectiveness of air purifiers. It should neither be ignored, nor considered the only important factor in determining the value of an air cleaner. Instead, potential customers should check for CADR numbers as one of a number of things to keep in mind, along with other factors such as long-term durability and the ability to filter out gasses and odors.
- CADR only measures tobacco smoke, dust, and pollen.
- CADR formulas only measure the ability to remove 80% of tobacco smoke assuming one air exchange per hour
- CADR does not measure the effectiveness of filtering the size of particles