

## Criteria for recommendation of Air Purifier, LRV2

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## Background

People who reside in our northern latitudes spend most of their time indoors. The air we breathe thus becomes an important factor for our health. A high amount of dust and particles contributes to unhealthy indoor air which irritates the mucous membranes which can contribute to poor health. Airborne allergens such as pollen or allergen from animals and mites cause problems for anyone who is allergic to them. Gases indoors can also adversely affect health. Those who have allergic and non-allergic respiratory problems (rhinitis and asthma) may experience relief from breathing filtered air.

The Asthma and Allergy Association (hereafter referred to as the Association) has developed the criteria below to meet the consumer's need for guidance in the choice of air purifiers.

An air purifier removes unwanted substances in the indoor air. There are different particle filters depending on the particle size and degree of separation sought. Gases are usually adsorbed in a carbon filter with a special impregnation depending on the type of gas. There are also other techniques today such as e.g. ionization. However, LRV2 (criteria for recommendation of air purifier Version 2) applies only to air purifiers that circulate the air and where particulate separation is handled in some form of filter. Thus, ionization directly in a room is not recommended, however, ionization in front of a filter can be recommended.

There are also medical treatments using TLA technology (Temperature controlled Laminar Airflow) that reduce allergy exposure in the respiratory zone through a filtered, temperature-controlled airflow. This product group is not included in the techniques reviewed by the criteria in this document.

Most air purifiers on the market are intended for particulate separation. Some of them can be supplemented with a gas absorber. Parameters that affect the efficiency of an air cleaner are the following:

- Airflow
- Filtration Efficiency
- Shortcut between air Inlet and outlet
- Replacement / cleaning of filters

When an air purifier is tested, it is placed in a closed chamber where particles are then supplied. The air purifier is started and what is measured is how efficiently it removes the particles in the chamber. The result is presented as " Clean Air Delivery Rate, CADR ", which can be said to be a collective name for the top three points above (airflow, filtration efficiency and shortcut between air Inlet and outlet). We will continue to use the trade term "CADR" in this document.

*The higher the CADR, the more efficient the air cleaner.*

Other parameters that affect the consumer's way of using the air purifier are:



- Noise level
- Operating costs

The Association assesses an air purifier based on how much clean air it delivers (CADR) at a given noise level. This is important because many air purifiers are placed in an environment where background noise can be disturbing. The criteria in this document are based on calculations for a bedroom where the sound level from the air purifier must not exceed 30 dBA.

*The higher the CADR at 30 dBA, the better the air cleaner for use in a residential environment.*

## Criteria

In order to make it easier for the buyer to choose a good air purifier, the following must be taken into consideration:

- CADR
- Sound Power level
- Service and maintenance
- The effect of the air purifier on the indoor environment, such as ozone generation.

## General information

The air purifier must meet all regulatory requirements and be approved from an electrical safety point of view by an accredited authority. Where applicable, EMC approval shall be provided. If the product is in any way ionizing, a test result for approved ozone levels is also required.

All existing approvals and test results must be attached to the application.

## CADR (equivalent air flow)

LRV2 takes into account the air purifier's efficiency in particle separation (CADR) at a given noise level. As additional information to the consumer, the air purifier's energy efficiency (CADR / W) at max 30 dBA is also presented.

The air purifier's CADR must be adapted to the size of the room where it will be used. The most common is to place the air purifier in the bedroom as this is where you spend the most time. Therefore, the requirements set out below are based on calculations for air purification of a bedroom.



The Swedish Housing Agency's building standards are different depending on the activity expected in each room. The fresh air flow in a living room should be about 0.5 air changes/hour.

In order to achieve a theoretical reduction of particles in the indoor air by about 80% (measured at a particle size of 0.3 - 0.5  $\mu\text{m}$ ), the air purifier's CADR should be 4 times greater than the outdoor air flow from the ventilation. The Association bases its recommendation on a bedroom of 10  $\text{m}^2$  with a height of 2.4 m.

The requirement for the air purifier's CADR per hour will then be:  $10 \times 2.4 = 24 \text{ m}^3 \times (4 \times 0.5) = 48 \text{ m}^3/\text{h}$ .

In order for an air purifier to be recommended by the Association, it must have a CADR of at least  $48 \text{ m}^3/\text{h}$  at a sound level not exceeding 30 dBA.

Testing shall be performed at all operating modes. The recommendation applies to all operating modes where the sound level does not exceed 30 dBA

## Sound power level

A noise level exceeding 30 dBA can be experienced as disturbing in an otherwise quiet environment such as e.g. a bedroom. The Swedish National Board of Housing, Building and Planning's requirements for sound power levels for fixed installations currently stands at 30 dBA. The air purifier is not permanently mounted but since it is to be used around the clock, the sound power level, when placed according to the supplier's recommendations, should not exceed 30 dBA when the air purifier is placed in a bedroom.

The test must be carried out by measuring the sound power according to ISO 3741. Based on the result, the sound level is calculated with a normal reverberation time of 0.5 seconds. Testing shall be performed at all operating modes.

## Service and maintenance

An air purifier as well as complete specifications and operating instructions shall be provided together with the application. Assessment of operation and functionality shall be carried out.

All controls and surfaces concerned are tested for nickel. The release of nickel should not exceed 0.5  $\mu\text{g} / \text{cm}^2$  per week in accordance with the current EU regulation (REACH, EC Regulation 1907/2006).

The manufacturer shall guarantee access to a replacement filter for a period of five years following that the air purifier has been taken out of production.



## Location in the room

The instruction manual should contain information on how to place the air purifier in the room for maximum efficiency. It should also explain why placement is important and describe how the air purifier should not be placed.

## Recommendation

### How is an air purifier recommended by the Association?

To perform the necessary tests, an air purifier is required to be sent to RISE, which is an independent accredited laboratory. There, CADR, sound power level and energy consumption are tested. The air purifier is then passed on to the Association's expert for technical review, testing of nickel release and assessment of handling, functionality and operating instructions.

In order to achieve as comparable results as possible between audits conducted at different times, the Association approves exclusive tests performed by RISE. After the tests performed and approved as above, the air cleaner is classified by the Association's Review Board. The classification forms the basis of an agreement between the Company and the Association regarding recommendations.

### Use of logotype

In order to obtain the right to use the Association's logo in marketing, the product must be reviewed and recommended in accordance with this criteria document LRV2. The Association's name and / or logotype may only be used in conjunction with the following information, which is also regulated in agreements regarding the use of the marking, and must be in direct connection with the use of the Association's name and / or logotype. The information must be clearly visible in all marketing, advertising, PR etc. where information is provided that the product is recommended by the Association. Information that must be associated with the Association's name and / or logotype is as follows:

1. What room volume has your product received recommendation for?
2. Which operating mode (s) has your product been recommended for?
3. What sound power level does your product have in the recommendation regarding points 1 and 2 above (must be less than or equal to 30 dBA)

If the maximum capacity differs from the recommended capacity, and the manufacturer wishes to specify the maximum capacity in the product description, it should be stated that the maximum capacity is not included in the recommendation.



## How is an application made?

Information and application forms are obtained digitally via contact with the administrator, [Marianne.Jarl@astmaoallergiforbundet.se](mailto:Marianne.Jarl@astmaoallergiforbundet.se)

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