



CONSUMER RELEVANT ECO-DESIGN AND ENERGY LABELLING REQUIREMENTS FOR ROOM-AIR-CONDITIONING APPLIANCES

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Introduction

Air conditioning in the broadest sense relates to all kinds of air treatment: heating, cooling, air renewal, humidity control and air purification¹. In recent years the demand for residential cooling increased dramatically in the EU. Whereas the use of residential cooling was predominantly used in Southern European countries, these appliances are also becoming more common in moderate temperature zones². Reasons for an increasing usage of room air conditioning appliances are linked to several heat waves in Europe (e.g. in the year 2003). In addition, a change of subjective comfort standards led to an increase as more and more consumers prefer constant room temperature levels.

From an environmental perspective, room air conditioning appliances are a problematic product group as these appliances consume a considerable amount of energy. Air conditioning appliances may use in a hot summer more energy than a refrigerator in the whole year. The expenses on energy might therefore after some years supersede the initial purchase price of the appliance³. Whereas the electricity consumption in the use phase has been identified as the main negative environmental impact, noise and the impact from refrigerants are also a matter of high concern. The high global warming potential resulting from room air conditioning appliances needs to be urgently addressed in order to reduce the pressure on the climate resulting from air cooling.

The European Commission is therefore proposing Eco-design and labelling requirements for room air conditioning appliances⁴ (RACs), local air coolers⁵ (LACs) and comfort fans⁶ based on the EU Eco-design Directive (2005/32/EC). ANEC and BEUC strongly welcome the intention to set mandatory Eco-design and labelling requirements for room air conditioning appliances, local air coolers and comfort fans.

In this paper, based on the Commission working document on implementing measures for ecodesign requirements for room air conditioning appliances, we

¹ ARMINES (ed.): Preparatory study on the environmental performance of residential room conditioning appliances, introduction to LOT 10, p. 7, August 2007, http://ecolaircon.eu/fileadmin/dam/ecolaircon/meeting2/Introduction_to_Lot_10_study_-_scope_definition.pdf.

² See Consumentenbond: "Verlangen naar koelte stijgt", Consumentengids June 2008, pp. 30-33. The article indicates that sales figures of RACs raised 8% between May and June 2007 compared to the previous year.

³ Stiftung Warentest: "Die Klimmacher", test 6/2008, p. 65.

⁴ Room Air Conditioners (RACs) are defined as a devices which are suitable for air cooling and/or heating in a single room using an electric compressor driven refrigerating/heating cycle. RACs consist of at least one separate outdoor unit and one or more separate indoor units to be connected through refrigerant lines. The primary function is to reach and maintain the indoor temperature at a desired level.

⁵ Local Air Coolers (LACs) are designed to cool air for a limited area inside a room by using a compressor driven refrigerating cycle.

⁶ A comfort fan is an air-moving device intended to locally increase the flow rate of ambient air aiming to increase the cooling comfort of persons within its range. Comfort fans are not cooling down the temperature inside a room.

make recommendations on the consumer needs which should be taken into account when deciding on the final Implementing Measure⁷. Our proposal addresses the need for correct installation, more ambitious energy efficiency requirements for local air coolers and lower noise levels.

Moreover, we discuss the Energy Label classifications, the layout of the label as well as the need for better market surveillance.

Ambition level and timing of Eco-design requirements

We welcome the setting of minimum energy efficiency requirements for room air conditioning appliances in two steps which will enter into force after two and after four years.

We noted that the proposed minimum requirements are set on a much lower level than best available technology in Asia performs today. As a study on benchmarking technology in Asia⁸ shows that producers sell different products depending on the energy efficiency requirements of each country, we are concerned that low minimum energy efficiency requirements would lead to a situation in which the cheap and inefficient appliances are sold in Europe.

The minimum energy efficiency requirements for local air coolers which require the Energy Efficiency Ratio (EER)⁹ to be 2.3 after two years and 2.6 after four years seem in particular to be too low. Existing products perform already much better as test results from consumer testing found EER values of up to 3.2. We therefore propose setting the EER for LACs at 2.6 after two years and to 3.0 after four years.

Measurement methods

The new calculation method for SEER¹⁰ and SCOP¹¹ seems to be useful to show the advantages of RAC devices with a variable compressor speed compared to RAC devices that regulate the temperature only by switching on and off. However, with regard to the new measurement methods, we would like to raise the following points:

- o The new measurement method requires calculating the 4 EER values as 4 different outdoor temperatures (cooling mode) and also 4 different COP¹² values at 4 different outdoor temperatures (heating mode). Thus, the new measurement method will be more complicated and costly for market surveillance authorities.

⁷ Working document on possible ecodesign and energy labelling requirements for room air conditioning appliances, local air coolers and comfort fans, 19 May 2009.

⁸ See: Benchmarking of air conditioner efficiency levels in five Asian countries, Report prepared by Danish Energy Management for the Australian Greenhouse Office, 2004.

⁹ The Energy Efficiency Ratio (EER) is defined as the ratio between the nominal cooling capacity and the electric power input at nominal cooling capacity.

¹⁰ SEER is the Seasonal Energy Efficiency Ratio; it refers to cooling

¹¹ SCOP is the Seasonal Coefficient of Performance; it refers to heating

¹² COP is the Coefficient of Performance

- Two of the outdoor temperatures (25°C and 20°C) for the cooling mode are lower than the indoor temperature (27°C). We wonder about the inclusion of these measurement points as in cases where the outdoor temperature is considerably lower than the indoor temperature, opening the window would cool down the room much better than using the air conditioner.
- We suggest simplifying the measurement method, e.g. by measuring only two temperature levels (full and part load).
- We also propose to make a detailed comparison of SEER and SCOP with the existing EER and COP values. The comparison should identify the costs related to the two different methods and the value of the additional information obtained.
- The suggested EER for LAC is not measured at the same conditions than according to EN 14511. This means the new calculation method is not comparable to the EERs measured on the basis of the existing standard. Extreme cooling conditions with a dry bulb temperature of 35 (24)°C for condenser inlet air and 27(19)°C for evaporator inlet air seems to be quite difficult to measure, especially for single duct LACs.
- The measurement method for LACs does not take into account hot air coming inside. However, consumer organisations take this into account when testing the performance of LACs. We therefore propose that the measurement method for the energy efficiency of LACs should take hot air coming inside into account as this would be more realistic.
- We welcome lowering the tolerances from 15% to 8% as too high test tolerances could result in exaggerating the energy performance of the appliances.

Requirements on noise levels need to be more ambitious

RACs are a source of noise, either indoor or outdoor, which is disturbing for residents or neighbors. In particular when RACs are installed in the sleeping or living room, too high noise levels put stress on the users.

The maximum noise levels for RACs and LACs as shown in the working document are far too high¹³. Considering that the benchmark values refer to 46 dB-A, the requirements on noise should be much stricter.

Results from consumer testing¹⁴ show that the maximum values for noise level (measured as sound pressure level in one meter distance) have been about 55 dB-

¹³ The noise level in the document uses sound power level (noise emissions) according to EN 12102:2008. Consumer organisations measure usually noise pressure levels (noise immissions). The method is different than for sound power levels (noise emissions).

A for LACs and the outdoor units of split air conditioners. The indoor units of room air conditioners have shown average values of 36 to 46 db-A. Consequently, stricter values will not put restrictions on the market.

When deciding on the noise level, it has also to be taken into account that the maximum noise exposure on workplaces according to EN ISO 11690-1 should not exceed 55 dB-A for an office workplace and should not exceed 45 dB-A when an activity has to be performed with concentration¹⁵.

- o The maximum noise levels for all RACs and LACs should be fixed to a maximum value of 60 dB-A for all indoor units.
- o To reduce the acoustic pollution, the requirements for outdoor units should be lowered by 5 dB-A. We recommend applying the following values:

Sound power level	RAC < 6 kW		RAC 6-12 kW		LAC	
	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor
dB-A	55	60	60	65	55	55

- o As comfort fans are usually placed next to the consumer, the noise levels for comfort fans also needs to be lowered.

Hard-off switch/ 0-Watt mode needed in order to avoid standby losses

All RACs with a remote control use energy in standby. Consumers are not aware that RACs use energy even when switched “off”¹⁶. Moreover, as many appliances are connected directly to the electricity grid, they are not able to avoid standby losses by unplugging the RAC.

As RACs are only used seasonally, all appliances should be equipped with a hard-off switch/ 0-Watt mode which allows consumers to switch the RACs completely off when not in use. The horizontal Eco-design Regulation on standby and off-mode losses (Commission Regulation (EC) No 1275/2008) is insufficient to avoid losses from standby as appliances which are only used several days per year¹⁷ should not always be in standby.

¹⁴ Consumentenbond, Consumentengids, June 2008 and Stiftung Warentest, test, June 2008.

¹⁵ ISO 11690-1:1996: Acoustics - Recommended practice for the design of low-noise workplaces containing machinery - Part 1: Noise control strategies.

¹⁶ Losses from standby are between 1 and 3 W. Some models have found to consume more than 8 W in standby. This could relate for instance in The Netherlands to additional costs of 35€ per year (154 kWh), see: Consumentengids, June 2008, p. 31. On standby see also Stiftung Warentest, test 6/2008, p. 66.

¹⁷ Consumer in The Netherlands indicated that they use room air conditioning appliances between 10 and 30 days per year. See Consumentengids, June 2008, p. 31. The preparatory study calculates with 350h per year in cooling mode.

We therefore propose introducing a generic Eco-design requirement which requires all RACs to have a hard-off-switch/ zero watt mode. The hard-off switch should be installed clearly visible at the front panels of the appliance.

Correct installation is important to protect the environment and consumers' health

RACs are sold to consumers not only through installers but also in do-it-yourself stores. This is problematic as consumers could try to install the appliances at home on their own. While local air coolers can be easily setup, professional knowledge is needed to install split RACs. In case the consumer does not connect the pipes containing the refrigerant properly, there is a risk of a loss of refrigerant and damage of the processor. A leak of refrigerant is damaging for the environment and could pose a health risk.

Moreover, for split units it is necessary to lead the pipes through a hole in the wall which must be insulated correctly in order to avoid a thermal bridge which would lead heating energy outside the room in the winter.

As installing split RACs need professional knowledge, retailers should be obliged to inform consumers about the need for professional installation and maintenance of split RACs on the packaging. All products should have a warning which indicates that professional installation is required for all split devices so that consumers are made aware of this requirement before making the purchase decision.

Consumer information about negative performance of LACs needed

RACs and LACs are sometimes available at the same shops. Although LACs (especially single duct) perform badly, it is difficult for consumers to find information about the differences of both types of appliances. We propose that the information on the package has to show and explain clearly that the duct must be installed in open windows or doors. The picture of the LACs with the duct must keep the proportions of the real appliance as showing the duct e.g. in smaller size would be misleading for consumers.

Product documentation requirements

We recommend giving the following information in the product documentation:

- General advice to consumers how to reduce heat loads without the use of room air conditioning appliances (e.g. advice to open windows early in the morning and to close shutters)
- Information that RACs have to be installed by qualified personnel only.
- Information that RACs and LACs contain a refrigerant which is either a greenhouse gas, toxic or combustible. It should be informed that therefore a damaging of the refrigerant cycle must be avoided and that the product needs to be uninstalled by qualified personnel and needs to be disposed of properly.

Energy Labelling requirements

Our concerns with regard to the Energy Label relate to three main points: First, the proposed Energy Label classifications need to be changed, second the pictograms on the Energy label needs to be clear and third we see a need for better market surveillance.

Empty classes at the bottom of the label and classes above "A" should be avoided

ANEC and BEUC are calling for an Energy Label for all product groups which is based on a closed A to G scale.

In the case of room air conditioning appliances, the Commission is proposing to show classes from A??¹⁸ to G on the label. However, due to the minimum energy efficiency requirements, several classes of the current labelling classification will be phased out. Classes on top of "A" are therefore not needed and should be avoided as it is confusing for consumers to have a nine class label of which most classes would be empty. Instead, the labelling classes should be distributed from A to G in a way that most classes are populated.

We argue that the Eco-design requirements should relate to class "G" as this would avoid having too many empty bands at the bottom of the label. It would also avoid showing classes on top of class "A" on the label, which are not needed in this case to inform consumers about the energy efficiency of room air conditioning appliances.

In order to make the labelling scheme more dynamic, the class boundaries should be made more ambitious every few years.

Energy Labelling should cover RACs and LACs in the same scale

Local Air Coolers are very inefficient products as a window has to stay open for the pipe. As a result warm air flows back into the room which requires more cooling. In addition the compressor produces also heat inside the room.

It is therefore important to inform consumers clearly about the bad performance and bad energy efficiency of LACs with regard to the function of "whole room cooling".

As the main aim of room air conditioning is cooling the air, the Energy Label should not apply different Energy Labelling scales for RACs and LACs. A differentiation would also be very unclear to the consumer as both products are sold for the same use. While we accept that a differentiation in the Eco-design requirements may be required in order to keep Local Air Coolers on the market, a differentiation for the Energy Label is not justified. Consumers must be aware that local air coolers consume a lot of energy and should therefore be in the worst labelling classes (class "G"). No local air cooler should be able to achieve class "A" or "B" as split appliances perform considerable better for the purpose of room cooling.

¹⁸ The name of the classes on top of class A has not been decided yet. However, the distribution of classes in the working document shows that 8 to 9 classes are proposed which means that there would be one to two classes on top of class "A".

The term "Eco-product" should be deleted

We ask to delete the term "Ecoproduct" from the Energy label as this could lead to confusion with the EU Eco-label. Confusion between products, which fulfill only the legal minimum requirements of Eco-design, and the EU Eco-label, which follows a full life-cycle approach, would be damaging for the credibility of the Eco-label scheme.

The term "Ecoproduct" would also be inappropriate as room air conditioning appliances are problematic for the environment in general. Instead of suggesting to consumers that air conditioners are "good" and "green" products it would be more important to make consumers aware of alternatives to room air conditioning (e.g. natural ventilation) in particular in climate zones where very hot temperatures are rather an exception.

Pictograms on the Energy Label need to be clear

With regard to the layout, we would like to point out that most of the proposed pictograms on the label are far from self explanatory for consumers. Whereas the pictograms for noise and electricity consumption in kWh per annum might be easily understood, the other pictograms are very much unclear.

It has to be ensured that *all* pictograms which will be used on the future Energy Label for room air conditioning appliances are easily understood by consumers.

Pictogram on carbon footprint should be deleted

The Energy Label shows a pictogram which informs consumers about the amount of CO₂ emissions per year. The figure on CO₂ emissions contains the global warming potential related to the emissions from electricity consumption and the loss of refrigerant from room air conditioning appliances.

Although we welcome the intention to make consumers aware of the high global warming potential of room air conditioning appliances, we consider the displayed pictogram not as useful to give this information to consumers. Consumers do not understand what the figure means as they have no reference value. Consequently this information will not guide the consumer towards more climate friendly appliances.

Moreover, we have doubts about the calculation method for the carbon footprint as the level of CO₂ emissions differs among EU countries depending on their energy mix (coal, nuclear, renewable etc.). Also the amount of refrigerant leaking from RACs per year is based on an average estimation and not on actual leakage.

We therefore propose deleting the pictogram on carbon emissions from the Energy Label.

For the information of consumers it will be much more important that the annual energy consumption in kWh will be shown prominently and in bold letters on the Energy Label as this will allow comparing the performance of different products. This annual energy consumption will be of particular importance in order to make consumers aware that local air coolers use more energy than split appliances.

Additional information with regard to the impact of different refrigerants, e.g. at the package, is however considered to be useful.

Information on noise should cover indoor and outdoor noise levels

For split appliances, where the compressor is located outside the room, the noise levels for indoor and outdoor noise should be indicated on the Energy Label. As the outdoor noise of the compressor could be extremely disturbing for neighbors, consumers should be well informed about the high noise levels before making a purchase decision.

Market surveillance needs to enforce correct labelling information

Consumer testing reports show that several of the tested appliances do not achieve the energy class which has been declared on the label¹⁹. This clearly shows the need for better enforcement of the Energy Label requirements. Moreover, a survey in shops by consumer testing organisations also found often that Energy Labels are missing²⁰.

Market surveillance should do regularly shop inspections and should carry out a sufficient number of product testing.

Surveillance activities should take place throughout the year but should be intensified several months before the expected peak demand of consumers for new RACs and LACs in order to ensure that consumers receive always correct information on the energy efficiency of both types of appliances.

With regard to the measurement methods, we have some concerns that the new proposed measurement method increases the costs of market surveillance considerably. According to EN 14511 at least two different temperature points had to be measured. The new proposal however asks for at least four temperature points at steady state for cooling and four points for heating.

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¹⁹ Stiftung Warentest rated three out of 12 appliances as poor because the appliances did not meet the energy efficiency values of the declared class. Three manufacturers labelled very energy consuming single pack air coolers as being class "A" or "B". See Stiftung Warentest, test 06/2008, p. 68. Similar cases have been observed by Consumentenbond. See Consumentengids, June 2008.

²⁰ The Portuguese consumer organisation DECO published a test on cheap air conditioners in 2008. Many of the cheap appliances did not show the Energy Label. This is even more problematic as most of the cheap appliances did not reach a good energy efficiency class. See: DECO Proteste, Ar condicionado: modelos baratos, May 2008.