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COMMISSION DECISION

of 9 November 2007

establishing the ecological criteria for the award of the Community eco-label to electrically driven, gas driven or gas absorption heat pumps

(notified under document number C(2007) 5492)

(Text with EEA relevance)

(2007/742/EC)

(OJ L 301, 20.11.2007, p. 14)

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(2007/742/EC)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community,

Having regard to Regulation (EC) No 1980/2000 of the European Parliament and of the Council of 17 July 2000 on a revised Community eco-label award scheme [1], and in particular the second subparagraph of Article 6(1) thereof and the sixth paragraph of point 2 of Annex V thereof,

After consulting the European Union Eco-Labelling Board,

Whereas:

(1) Under Regulation (EC) No 1980/2000, the Community eco-label may be awarded to a product possessing characteristics which enable it to contribute significantly to improvements in relation to key environmental aspects.

(2) Regulation (EC) No 1980/2000 provides that specific eco-label criteria, drawn up on the basis of the criteria drafted by the European Union Eco-Labelling Board, are to be established according to product groups.

(3) The ecological criteria, as well as the related assessment and verification requirements, should be valid for a period of three years.

(4) The measures provided for in this Decision are in accordance with the opinion of the Committee instituted by Article 17 of Regulation (EC) No 1980/2000,

HAS ADOPTED THIS DECISION:

Article 1

The product group ‘electrically driven, gas driven or gas absorption heat pumps’ shall comprise heat pumps, which can concentrate energy present in the air, ground or water into useful heat for the supply of space heating or the opposite process for space cooling. A ‘heat pump’ is the device or set of devices as delivered by the manufacturer or importer to the distributor, retailer or installer. This delivery may or may not include the delivery of circulating pumps at the sink or source side, however for calculation of coefficient of performance (COP) values the power consumption of circulating pumps shall always be taken into account, according to the methodology of EN14511:2004 (if the manufacturer cannot provide data, a default value is taken). For gas absorption heat pumps the methodology shall be according to EN12309-2:2000.

The product group shall cover only electrically driven, gas driven or gas absorption heat pumps with a maximum heating capacity of 100 kW.

[1] OJ L 237, 21.9.2000, p. 1.

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The product group ‘electrically driven, gas driven or gas absorption heat pumps’ shall not cover the following:

(a) heat pumps which can only provide hot water for sanitary use;

(b) heat pumps which can only extract heat from a building and eject it to the air, ground or water thus resulting in space cooling.

Article 2

In order to be awarded the Community eco-label under Regulation (EC) No 1980/2000, a heat pump must fall within the product group ‘electrically driven, gas driven or gas absorption heat pumps’ and must comply with each of the criteria set out in the Annex to this Decision.

Article 3

For administrative purposes, the code number assigned to the product group ‘electrically driven, gas driven or gas absorption heat pumps’ shall be ‘31’.

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Article 4

The ecological criteria for the product group ‘electrically driven, gas driven or gas absorption heat pumps’, and the related assessment and verification requirements, shall be valid until 31 December 2011.

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Article 5

This Decision is addressed to the Member States.

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ANNEX

ECOLOGICAL CRITERIA

The aims of the criteria

These criteria aim to limit the environmental impacts from manufacture, operation and end of life of electrically driven, gas driven or gas absorption heat pumps. They include:

— the efficiency of heating and/or heating/cooling of buildings,

— reducing the environmental impact of heating and/or heating/cooling buildings,

— reducing or preventing the risks for the environment and for human health related to the use of hazardous substances,

— ensuring that proper information on the heat pump and its efficient operation is provided to the customer and the installer of the heat pump.

The criteria are set at levels that promote the labelling of heat pumps that ensure low environmental impact.

Assessment and verification requirements

For assessment and verification of heat pumps the applicant can group the heat pumps into 'basic models'. The basic models shall be defined by units which are essentially the same in terms of thermal performance and function and the same or comparable in terms of basic components, specifically fans, coils, compressors and motors.

The specific assessment and verification requirements are indicated immediately below each criterion.

Where appropriate, test methods and standards other than those indicated for each criterion may be used if their equivalence is accepted by the competent body assessing the application.

Where the applicant is required to provide declarations, documentation, analyses, test reports, or other evidence to show compliance with the criteria, it is understood that these may originate from the applicant and/or his supplier(s) and/or their supplier(s), et cetera, as appropriate.

Where appropriate, competent bodies may require supporting documentation and may carry out independent verifications.

The competent bodies are recommended to take into account the implementation of recognised environmental management schemes, such as EMAS or ISO 14001, when assessing applications and monitoring compliance with the criteria.

(*Note:* it is not required to implement such management schemes).

In addition, the test laboratory for noise and efficiency shall fulfil the general requirements according to the standard EN-ISO/IEC 17 025:2005. The laboratory shall be independent and accredited for testing according to relevant test methods. Other laboratories may be accepted if no laboratory accredited for testing is known of, in the country where the applicant is located. In such cases the laboratory shall be independent and competent.

For information:

Coefficient of performance (COP) is the ratio of heat output to electricity or gas input for a specified source and output temperature.

Energy efficiency ratio (EER) is ratio of cold output to electricity or gas input for a specified source and output temperature.

The primary energy ratio (PER) is given by: COP × 0,40 (or COP/2,5) for electrically driven heat pumps and by COP × 0,91 (or COP/1,1) for gas driven or gas absorption heat pumps, where 0,40 is the current European average electricity power generation efficiency including grid losses and 0,91 is the current European average gas efficiency including distribution losses according

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to Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC [1].

1. ***Efficiency in heating mode (COP)***

The efficiency of the heat pump unit shall exceed the following minimum requirements of the coefficient of performance (COP) and primary energy ratio (PER).

Type of heat pump: heat source/heat sink	Outdoor unit [°C]	Indoor unit [°C]	Min. COP	Min. COP	Min. PER
			Electric heat pump	Gas heat pump	
air/air	Inlet dry bulb: 2 Inlet wet bulb: 1	Inlet dry bulb: 20 Inlet wet bulb: 15 max	2,90	1,27	1,16
air/water	Inlet dry bulb: 2 Inlet wet bulb: 1	Inlet temperature: 30 Outlet temperature: 35	3,10	1,36	1,24
		Inlet temperature: 40 Outlet temperature: 45	2,60	1,14	1,04
brine/air	Inlet temp.: 0 Outlet temp.: – 3	Inlet dry bulb: 20 Inlet wet bulb: 15 max	3,40	1,49	1,36
brine/water	Inlet temp: 0 Outlet temp: – 3	Inlet temperature: 30 Outlet temperature: 35	4,30	1,89	1,72
		Inlet temperature: 40 Outlet temperature: 45	3,50	1,54	1,40
water/water	Inlet temp: 10 Outlet temp: 7	Inlet temperature: 30 Outlet temperature: 35	5,10	2,24	2,04
		Inlet temperature: 40 Outlet temperature: 45	4,20	1,85	1,68
water/air	Inlet temp: 15 Outlet temp: 12	Inlet dry bulb: 20 Inlet wet bulb: 15 max	4,70	2,07	1,88
	(water loop source) Inlet temp: 20 Outlet temp: 17	Inlet dry bulb: 20 Inlet wet bulb: 15 max	4,40	1,93	1,76

Assessment and verification: Testing shall be performed in accordance to EN 14 511:2004. The test shall be performed at the full capacity of the heat pump in question, at the conditions specified in the table. An independent test laboratory accredited for the stated testing shall verify the given values. Heat pumps which are certified in the Eurovent certification programme or DACH certification programme or another programme approved by the competent body do not require additional testing by an independent laboratory for the given values. The test reports shall be submitted with the application.

2. ***Efficiency in cooling mode (EER)***

If the heat pump is reversible and can cool, then the efficiency of the heat pump unit shall exceed the following minimum requirements of the energy efficiency ratio (EER) in cooling mode.

[1] OJ L 114, 27.4.2006, p. 64.

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Type of heat pump:	Outdoor unit [°C]	Indoor unit [°C]	Min. EER	Min. EER	Min. PER
			Electric heat pump	Gas heat pump	
air/air	Inlet dry bulb: 35 Inlet wet bulb: 24	Inlet dry bulb: 27 Inlet wet bulb: 19	3,20	1,41	1,3
air/water	Inlet dry bulb: 35 Inlet wet bulb: —	Inlet temperature: 23 Outlet temperature: 18	2,20	0,97	0,9
		Inlet temperature: 12 Outlet temperature: 7	2,20	0,97	0,9
brine/air	Inlet temp: 30 Outlet temp: 35	Inlet dry bulb: 27 Inlet wet bulb: 19 max	3,30	1,45	1,3
brine/water	Inlet temp: 30 Outlet temp: 35	Inlet temperature: 23 Outlet temperature: 18	3,00	1,32	1,2
		Inlet temperature: 12 Outlet temperature: 7	3,00	1,32	1,2
water/water	Inlet temp: 30 Outlet temp: 35	Inlet temperature: 23 Outlet temperature: 18	3,20	1,41	1,3
		Inlet temperature: 12 Outlet temperature: 7	3,20	1,41	1,3
water/air	Inlet temp: 30 Outlet temp: 35	Inlet dry bulb: 27 Inlet wet bulb: 19	4,40	1,93	1,8

Assessment and verification: Testing shall be performed in accordance to EN 14 511:2004; for gas absorption heat pumps in accordance with EN12309-2:2000. The test shall be performed at the full capacity of the heat pump in question, at the conditions specified in the table. An independent test laboratory accredited for the stated testing shall verify the given values. Heat pumps which are certified in the Eurovent certification programme or DACH certification programme, or another programme approved by the competent body, do not require additional testing by an independent laboratory for the given values. The test reports shall be submitted with the application.

3. ***Refrigerant***

The global warming potential (GWP) for the refrigerant must not exceed GWP value > 2 000 over a 100 year period. If the refrigerant has a GWP of less than 150 then the minimum requirements of the coefficient of performance (COP) and primary energy ratio (PER) in heating mode and the energy efficiency ratio (EER) in cooling mode, as set out in criteria 1 and 2 of this Annex, shall be reduced by 15 %.

GWP values considered will be those set out in Annex 1 of Regulation (EC) No 842/2006 of the European Parliament and of the Council ([1]).

Assessment and verification: The names of refrigerant/s used in the product shall be submitted with the application, along with their GWP values according to the Regulation above. The GWP values of refrigerants shall be calculated in terms of the 100-year warming potential of one kilogram of a gas relative to one kilogram of CO_2.

For fluorinated refrigerants, the GWP values shall be those published in the third assessment report (TAR) adopted by the Intergovernmental Panel on Climate Change (2001 IPCC GWP values for a 100 year period) ([2])

([1]) OJ L 161, 14.6.2006, p. 1.
([2]) IPCC Third Assessment Climate Change 2001. A Report of the Intergovernmental Panel on Climate Change: http://www.ipcc.ch/pub/reports.htm

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For non-fluorinated gases, the GWP values are those published in the First IPCC assessment over a 100 year period ([1]).

GWP values for mixtures of refrigerants shall be based on the formula stated in Annex I of the Regulation 842/2006.

4. ***Secondary refrigerant***

(*Note:* not applicable to all types of heat pumps within this product group)

The secondary refrigerant, brine or additives must not be substances classified as environmentally hazardous or constituting a health hazard as defined by Council Directive 67/548/EEC ([2]) concerning environmental hazard and its subsequent amendments.

Assessment and verification: The name/s of the secondary refrigerant/s used shall be submitted with the application.

5. ***Noise***

The sound power level(s) shall be tested and stated in dB(A) on the information fiche.

Assessment and verification: Testing shall be performed in accordance with ENV-12 102. The test report shall be submitted with the application.

6. ***Heavy metals and flame retardants***

Cadmium, lead, mercury, chromium 6+ or the flame retardants, i.e. poly-brominated biphenyl (PBB) or poly-brominated diphenyl ether (PBDE) flame retardants as listed in Article 4 of Directive 2002/95/EC of the European Parliament and Council ([3]), may not be used in the heat pump or in the heat pump system, taking into account the tolerances specified in Commission Decision 2005/618/EC ([4]) amending Directive 2002/95/EC. This requirement for flame retardants shall take account of subsequent adaptations and amendments made to that Directive regarding the use of Deca-BDE.

Assessment and verification: A certificate signed by the producer of the heat pump.

7. ***Installer Training***

The applicant shall ensure that suitable training is available for installers in Member States where the product is to be marketed. This training shall include information relevant for sizing and installing the heat pump and completing the information fiche for consumers.

Assessment and verification: A declaration shall be submitted with the application describing the training available and stating where such training is available.

8. ***Documentation***

The applicant shall provide a comprehensive manual for installation, maintenance and a manual for operating the heat pump.

Assessment and verification: Maintenance, installation and operation manuals shall be submitted with the heat pump and fulfil the requirements of EN378:2000 or any revision thereof.

9. ***Spare parts availability***

The applicant shall ensure the availability of spare parts for a period of 10 years from the date of sale.

Assessment and verification: A declaration that spare parts will be made available for 10 years shall be submitted with the application along with an explanation of how this availability will be guaranteed.

([1]) Climate Change, The IPCC Scientific Assessment, J.T Houghton, G.J. Jenkins, J.J. Ephraums (ed.) Cambridge University Press, Cambridge (UK) 1990.
([2]) OJ 196, 16.8.1967, p. 1.
([3]) OJ L 37, 13.2.2003, p. 19.
([4]) OJ L 214, 19.8.2005, p. 65.

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10. ***Information fiche***

The applicant shall ensure that the blank 'information fiche for customers' attached to this Annex is available at point of sale to provide appropriate advice to consumers about the heat pump. The completed 'fiche for the use of installers' attached to this Annex must also be made available to installers.

The applicant shall supply suitable tools, computer programs and guidance so that competent installers are able to calculate the performance parameters of the heat pump system such as seasonal performance factor, seasonal energy efficiency ratio, primary energy ratio and annual emissions of carbon dioxide. In addition the installer shall be capable of completing the information fiche for consumers prior to the consumer purchase of the equipment.

Assessment and verification: The applicant must submit the completed 'information fiche for installers' and describe how they intend to ensure that it will be made available for installers. They must also describe how they intend to ensure that the information fiche for customers is made available to them at the points of sale of their products.

11. ***Information appearing on the eco-label***

Box 2 of the Ecolabel shall include the following text:

Amongst heat pumps, this product has:

— higher energy efficiency,

— lower global warming impact,

The following text (or equivalent text) shall appear on the packaging of the product: 'For more information on why this product has been awarded the Flower please visit the web-site: http://europa.eu.int/ecolabel'.

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Guidance for *purchasing* an Ecolabelled heat pump

— Information fiche for customers —

Warning! Read before purchasing

Efficient operation of this heat pump will only be ensured if the system is correctly matched to the heating or cooling demand of the building and climate zone in which it is installed!

Always consult a competent installer and ask them to complete this fiche before purchasing!

The EU Ecolabel is awarded to those models of heat pump which are more energy efficient and which minimise their environmental impacts.

This fiche should be completed by a qualified installer to provide you with information and recommendations about the most suitable heat pump system for your home. In this way you will obtain the benefits of the very high efficiency of heat pumps which concentrate the heat stored in the air, ground or water.

Some systems are also reversible and can produce cooling through extracting heat and ejecting it to the immediate surroundings. Some systems may also provide hot water for sanitary use.

Heat pumps can be selected which can be used with most distribution systems including radiators, warm air and under floor heating, and can be retrofitted to most existing heating systems with some suitable precautions as set out below.

Reducing heat loss and solar gain of buildings

If your dwelling is more than 10 years old, before choosing a heat pump, it may be cost effective to improve your insulation first, to reduce heat loss for heating you building or heat gain if you are looking to cool it. (It is actually more efficient to fit a smaller heat pump in a well insulated building, for example). If you accept the installer's recommendations for improving insulation, the heat pump you buy should then be sized appropriately.

For further information on reducing heat loss or solar gain and sizing and installing heat pumps systems consult *www.kyotoinhome.info*

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Information and recommendations for installing a heat pump in your home

Customer name .....

Address .....

Building type: detached/semi-detached/terraced/apartment

Approximate year built:

1. **Description of existing heating system/building**	
Fuel type	oil/mains gas/direct electricity/coal/bottled gas/other
Existing distribution system	radiators/warm air/under floor heating/other
Minimum design temperature for heating of current system (°C)	
Annual heating demand of building in current state (kW) Annual cooling demand of building in current state (kW)	
Maximum design temperature for cooling of current system (°C)	
Potential Solar heat gain of building in current state (kW)	

2. **Recommendations for upgrading building insulation**	
Measures for reducing heat loss	
Reduced heat loss (kW):	
Measures for reducing solar gain	
Reduced solar gain (kW):	

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3. **Recommended heat pump system**

Using information supplied by the manufacturer and the type and location of your dwelling, the following recommendations for your new heating or heating/cooling system are made:

primary heating	
heat pump manufacturer	
model	
heat source	ground/water/air
distribution medium	radiators/warm air/under floor heating/other
refrigerant type and GWP value	natural/artificial
heat capacity (kW)	
heat output/electricity input	
seasonal efficiency over year	
capable of supplying domestic hot water?	Yes/no
auxiliary heating type heat capacity (kW)	
cooling (if required) cooling capacity (kW) cold output/electricity input	
annual energy demands and CO_2 emissions annual energy consumption (kWh) equivalent carbon dioxide emissions (kg CO_2): conversion factor used:	

Installer signature .....

Qualifications/training .....

Company .....

Address .....

.....

Date .....

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Guidance for *installing* an Ecolabelled heat pump

— Information fiche for installers —

Warning! Read before purchasing

Efficient operation of this heat pump requires a competent installer to design the heating system to match the heating or cooling demand of the building and climate zone and to install the system in accord with the manufacturer's instructions

The EU Ecolabel is awarded to those models of heat pump which are more energy efficient and which minimise their environmental impacts

Heat pumps have a very high efficiency because they only use energy to concentrate the heat present in the ground, water or air. Some models can also operate in reverse mode and produce cooling by ejecting heat from a dwelling. The information contained in this fiche will enable you to ensure that the benefits of the heat pump unit are carried over to the collection and distribution systems and to complete the fiche which shall be given to the customer to explain your choice.

1. **Minimum information to be supplied by the manufacturer**

manufacturer	
model	
heat collector	
heat distribution medium	
heating capacity (kW)	
cooling capacity (kW)	
hot water supply	
Refrigerant type	
noise level (dbA)	
parts availability from date of sale (years)	
coefficient of performance (heating)	
specifying inlet and outlet temperatures (°C)	
energy efficiency ratio (cooling)	
specifying inlet and outlet temperatures (°C)	

For retrofitting to existing heating systems, the heat pump should be selected to match the existing distribution system which may be ducted warm air, hot water via radiators or underfloor heating. As the outlet temperature may be lower than that of the boiler it will replace, it is essential to identify ways of reducing the heat loss or solar gain in order to maintain the same size of distribution system.

Definitions

Coefficient of performance (COP) is the ratio of heat output to electricity input for a specified source and output temperature.

Energy efficiency ratio (EER) is the ratio of cold output to electricity input for a specified source and output temperature.

Seasonal coefficient of performance (SCOP) is the coefficient of performance averaged over the length of the heating season for the heat pump system at a specified location.

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Seasonal energy efficiency ratio (SEER) is the energy efficiency ratio averaged over the length of the cooling season for the heat pump system at a specified location.

The primary energy ratio (PER) is given by: COP × 0,40 (or COP/2,5) for heat pumps with electrically driven compressors and by COP × 0,91 (or COP/1,1) for heat pumps with gas driven compressors, where 0,40 is the current European average electricity power generation efficiency including grid losses and 0,91 is the current European average gas efficiency including distribution losses.

The manufacturer shall provide programs, tools and guidelines to help you perform the following calculations. Climatic data should be appropriate for the geographical location of the building.

2. **Reducing the heat loss and solar gain of buildings**

If the dwelling is more than 10 years old, then it will probably be cost effective to reduce the heat loss by increasing the insulation level and to reduce the solar gain by restricting the direct rays of the sun during the summer. If the customer accepts your recommendations then the system should be sized for the reduced heat loss and solar gain.

For further information on reducing heat loss or solar gain or sizing and installing heat pumps systems consult *www.kyotoinhome.info*

3. **Heat loss and sizing of the heating system**

The heat loss of the building shall be calculated in accordance with national practice or using a suitable validated computer program based on EN 832, the Euronorm for calculating heat loss. This heat loss should then be compared with the current values required by building codes. For existing buildings, it is generally cost effective to bring the insulation standard closer to current values *before* sizing the heat pump for the reduced heat loss.

Seasonal performance factor and energy consumption for heating

The calculation shall consider:

— climate (outdoor air temperature),

— design outdoor temperature,

— the variation of the ground-temperature over a year (for ground-source heat pumps, both with vertical and horizontal collectors),

— desired temperature indoors,

— temperature level of hydronic heating systems,

— annual energy demand for space heating,

— annual energy demand for domestic hot water (if applicable),

Primary Energy Ratio (PER) and Annual CO_2 emissions

The average efficiency for power/gas generation as well as electric grid/gas distribution losses to be used in the calculation. CO_2 emissions and savings to be calculated based on the primary energy usage.

4. **Solar gain and sizing of the cooling system**

If the system can also produce cooling then the solar gain of the building shall be calculated in accordance with national practice or using a validated computer program. This gain should then be compared with the current values required by building codes. For existing buildings, it is generally cost effective to reduce the solar gain *before* sizing the heat pump for the reduced solar gain.

Seasonal energy efficiency ratio and energy consumption for cooling

The calculation shall consider:

— climate (outdoor air temperature),

— design outdoor temperature,

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— the variation of the ground-temperature over a year (for ground-source heat pumps, both with vertical and horizontal collectors),

— desired temperature indoors,

— temperature level of hydronic heating systems,

— annual energy demand for space cooling.

Primary Energy Ratio (PER) and Annual CO_2 emissions

The average efficiency for power/gas generation as well as electric grid/gas distribution losses to be used in the calculation. CO_2 emissions and savings to be calculated based on the primary energy usage.

5. **Training for installers and drillers**

Suitable courses are available in most Member States to enable installers to obtain appropriate national or European accredited qualifications. Manufacturers shall either organise their own courses to assist installers with using their equipment or work with local training institutes to provide such information as part of their courses.

For ground source heat pumps where a vertical bore hole is required, suitable courses for drillers are available in some Member States.