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EUROPEAN COMMISSION

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Working Document on

COMMISSION REGULATION (EU) No .../..

**implementing Directive 2009/125/EC of the European Parliament and of the Council
with regard to ecodesign requirements for air conditioners and comfort fans**

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COMMISSION REGULATION (EU) No .../..

**implementing Directive 2009/125/EC of the European Parliament and of the Council
with regard to ecodesign requirements for air conditioners and comfort fans**

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products¹, and in particular Article 15(1) thereof,

After consulting the Ecodesign Consultation Forum,

Whereas:

- (1) Under Directive 2009/125/EC ecodesign requirements should be set by the Commission for energy-related products representing significant volumes of sales and trade, having significant environmental impact and presenting significant potential for improvement through design in terms of their environmental impact, without entailing excessive costs.
- (2) Article 16(2), first indent, of Directive 2009/125/EC provides that in accordance with the procedure referred to in Article 19(3) and the criteria set out in Article 15(2), and after consulting the Ecodesign Consultation Forum, the Commission shall, as appropriate, introduce implementing measures offering a high potential for cost-effective reduction of greenhouse gas emissions, such as heating, ventilation and air-conditioning systems (HVAC).
- (3) The Commission has carried out a preparatory study to analyse the technical, environmental and economic aspects of air conditioners and comfort fans typically used in households and small commercial establishments. The study has been developed together with stakeholders and interested parties from the EU and third countries, and the results have been made publicly available.
- (4) The main environmental aspects of the products covered, identified as significant for the purposes of this Regulation, are energy consumption in use phase and sound power level. The preparatory study also identified possible refrigerant leakage as a significant

¹ OJ L 285, 31.10.2009, p. 10–35.

environmental aspect in form of direct greenhouse gas emissions, representing on average 10-20% of the combined direct and indirect greenhouse gas emissions.

- (5) Refrigerants are addressed under Regulation 842/2006/EC² in containing, preventing and thereby reducing emissions of fluorinated greenhouse gases covered by the Kyoto Protocol. Consequently, no specific requirements on refrigerants are set in this Regulation. However, a bonus is proposed under the ecodesign requirements to steer the market towards the use of refrigerants with reduced harmful impact on the environment. The bonus will lead to lower minimum energy efficiency requirements for appliances using low-GWP refrigerants.
- (6) As shown in the preparatory study and confirmed during the impact assessment, there is a lack of information on the efficiency of comfort fans. For this reason, no minimum energy performance requirements can be set on comfort fans at this stage. However, product information requirements on comfort fans will ensure that the efficiency of the appliance and the measurement method used be well visible on the product. This will provide market surveillance authorities important information and allow efficient monitoring of the market for the purposes of setting minimum energy efficiency requirements in the future.
- (7) Standby and off-mode functions can be responsible for an important part of the total power consumption of these appliances. For air conditioners, except for double and single ducts, power consumption of these functions is part of the minimum energy performance requirements and of the seasonal efficiency measurement method. Standby and off-mode requirements for double and for single ducts are set on the basis of the Ecodesign requirements of Commission Regulation 1275/2008/EC³.
- (8) The annual electricity consumption of products subject to this Regulation was estimated to have been 30 TWh in the EU in 2005. Unless specific measures are taken, annual electricity consumption is predicted to be 74 TWh in 2020. The preparatory study shows that the electricity consumption of products subject to this Regulation can be significantly reduced.
- (9) The combined effect of ecodesign requirements set out in this Regulation and Commission delegated Regulation (EC) No XX/2010/EC of xx xxxxx 2010 implementing the recast Directive 2010/30/EC of the European Parliament and of the Council with regard to the indication by labeling and standard product information of the consumption of energy and other resources by energy-related products on air conditioners is expected to result in annual electricity savings of 11 TWh by 2020, compared to the situation if no measures are taken.
- (10) The preparatory study shows that requirements regarding other ecodesign parameters referred to in Annex I, Part 1, of Directive 2009/125/EC are not necessary as electricity consumption and sound power level of air conditioners in the use phase are the most significant environmental aspects.

² OJ L 161, 14.6.2006, p. 1.

³ OJ L 339, 18.12.2008, p. 45.

- (11) Products subject to this Regulation should be made more energy efficient by applying existing non-proprietary cost-effective technologies that can reduce the combined costs of purchasing and operating these products.
- (12) The ecodesign requirements should not affect functionality from the end-user's perspective and should not negatively affect health, safety or the environment. In particular, the benefits of reducing electricity consumption during the use phase should more than offset any possible additional environmental impact during the production phase.
- (13) The ecodesign requirements should be introduced gradually in order to provide a sufficient timeframe for manufacturers to re-design products subject to this Regulation. The timing should be such as to avoid negative impacts on the functionalities of equipment on the market, and to take into account cost impacts for end-users and manufacturers, in particular small and medium-sized enterprises, while ensuring timely achievement of the objectives of this Regulation.
- (14) Measurements of the relevant product parameters should be performed through reliable, accurate and reproducible measurement methods, which take into account the recognised state of the art measurement methods including, where available, harmonised standards adopted by the European standardisation bodies, as listed in Annex I to Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations and of rules on Information Society services⁴.
- (15) In accordance with Article 8 of Directive 2009/125/EC, this Regulation specifies the applicable conformity assessment procedures.
- (16) In order to facilitate compliance checks, manufacturers should provide information in the technical documentation referred to in Annexes V and VI of Directive 2009/125/EC insofar as this information relates to the requirements laid down in this Regulation.
- (17) In addition to the legally binding requirements laid down in this Regulation, indicative benchmarks for best available technologies should be identified to ensure the wide availability and easy accessibility of information on the life-cycle environmental performance of products subject to this Regulation.
- (18) The measures provided for in this Regulation are in accordance with the opinion of the Committee established by Article 19(1) of Directive 2009/125/EC,

HAS ADOPTED THIS REGULATION:

Chapter 1
Subject matter and scope

1. This Regulation establishes eco-design requirements for the placing on the market of electric mains-operated *air conditioners* with a *rated capacity* of $\leq 12\text{kW}$ for cooling

⁴ OJ L 204, 21.7.1998, p. 37.

– or heating, if the product has no cooling function - and *comfort fans* with an electric *fan power input* $\leq 125\text{W}$.

2. This Regulation shall not apply to:
 - a) appliances that use non-electric energy sources;
 - b) air conditioners of which the condenser- or evaporator-side, or both, can not be supplied by air.

Chapter 2

Definitions

In addition to the definitions set out in Article 2 of Directive 2009/125/EC, the following definitions shall apply:

1. ‘*Air conditioner*’ means a device capable of cooling or heating, or both, indoor air, using a vapour compression cycle driven by an electric compressor. The definition includes ‘*air conditioners*’ that provide additional functionalities such as dehumidification, air-purification, ventilation or supplemental air-heating by means of electric resistance heating. The definition also includes appliances that may use water (either condensate water that is formed on the evaporator side or externally added water) for evaporation on the condenser, provided that the device is also able to function without the use of additional water, using air only;
2. ‘*Double duct*’ means an ‘*air conditioner*’ in which, during cooling (heating), the condenser (evaporator) intake air is introduced from the outdoor environment to the unit by a duct and rejected to the outdoor environment by a second duct, and which is placed wholly inside the space to be conditioned, near a wall;
3. ‘*Single duct*’ means an ‘*air conditioner*’ in which, during cooling (heating), the condenser (evaporator) intake air is introduced from the space containing the unit and discharged outside this space;
4. ‘*Rated capacity*’ (P_{rated}) means the cooling capacity or heating capacity (depending on the specified function) of the vapour compression cycle of the unit at *standard rating conditions* for cooling or heating, as declared by the manufacturer;
5. ‘*Comfort fan*’ means an appliance designed for creating air movement around (part of) a human body for personal cooling comfort. This definition includes comfort fans that can perform additional functionalities such as lighting;
6. ‘*Fan power input*’ (P_{F}) means the electric power input of a ‘comfort fan’ in Watt operating at the declared *maximum fan flow rate*, measured with the *oscillation mechanism* active (if applicable).

Chapter 3

Ecodesign requirements

The ecodesign requirements for air conditioners and comfort fans are set out in Annex I.

Each ecodesign requirement shall apply in accordance with the following timetable:

1. From 1 January 2012:
 - single ducts and double ducts shall correspond to requirements as indicated in Annex I, Point 2a.
2. From 1 July 2012:
 - air conditioners, except single and double ducts, shall correspond to requirements as indicated in Annex I, Point 2b and Points 3a, 3b, 3c;
 - single and double ducts shall correspond to requirements as indicated in Annex I, Points 3a, 3b, 3d;
 - comfort fans shall correspond to requirements as indicated in Annex I, Points 3a, 3b, 3e.
3. From 1 January 2014:
 - air conditioners shall correspond to ecodesign requirements as indicated in Annex I, Point 2c;
 - single ducts and double ducts shall correspond to requirements as indicated in Annex I, Point 2d.

Compliance with ecodesign requirements shall be measured and calculated in accordance with requirements set out in Annex II.

Chapter 4 **Conformity assessment**

1. The conformity assessment procedure referred to in Article 8 of Directive 2009/125/EC shall be the internal design control system set out in Annex IV to that Directive or the management system set out in Annex V to that Directive.
2. For the purposes of conformity assessment pursuant to Article 8 of Directive 2009/125/EC, the technical documentation file shall contain a copy of the calculation set out in Annex II to this Regulation.

Chapter 5 **Verification procedure for market surveillance purposes**

When performing the market surveillance checks referred to in Article 3(2) of Directive 2009/125/EC for compliance with requirements set out in Annex I to this Regulation, the Member States authorities shall apply the verification procedure described in Annex III to this Regulation.

Chapter 6
Benchmarks

The indicative benchmarks for best-performing air conditioners available on the market at the time of entry into force of this Regulation are set out in Annex IV.

Chapter 7
Revision

The Commission shall review this Regulation in the light of technological progress no later than five years after its entry into force and present the result of this review to the Ecodesign Consultation Forum. The review shall in particular assess the efficiency and sound power level requirements, the approach to promote the use of low-GWP refrigerants and the scope of the Regulation for air conditioners, including air conditioners above 12kW rated output power. The review shall also assess the appropriateness of the seasonal calculation and measurement method, including possible cooling seasons.

Chapter 8
Entry into force

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels,

For the Commission

The President

ANNEX I
Ecodesign requirements

1 DEFINITIONS FOR THE PURPOSES OF THE ANNEX I

- (1) ‘Standard rating conditions’ means the combination of indoor (T_{in}) and outdoor temperatures (T_j) that describe the operating conditions while establishing the rated capacity, sound power level, nominal air flow rate and/or rated energy efficiency ratio (EER_{rated}), rated coefficient of performance (COP_{rated}) for cooling or heating, as described in Annex II, table 2;
- (2) ‘Indoor temperature’ (T_{in}) means the dry bulb indoor air temperature [$^{\circ}C$] (with the relative humidity indicated by the corresponding wet bulb temperature);
- (3) ‘Outdoor temperature’ (T_j) means the dry bulb outdoor air temperature [$^{\circ}C$] of which relative humidity can be indicated by a corresponding wet bulb temperature;
- (4) ‘*Rated energy efficiency ratio*’ (EER_{rated}) means the *declared capacity* for cooling [kW] divided by the *Rated power input for cooling* [kW] of a unit when providing cooling at *standard rating conditions*;
- (5) ‘*Rated coefficient of performance*’ (COP_{rated}) means the *declared capacity* for heating [kW] divided by the *Rated power input for heating* [kW] of a unit when providing heating at *standard rating conditions*;
- (6) ‘*Global warming potential*’ (*GWP*) means the measure of how much 1 kg of the refrigerant applied in the vapour compression cycle is estimated to contribute to global warming, expressed in kg CO₂ equivalents over a 100 year time horizon;
- (7) ‘*Off mode*’ is a condition in which the equipment (air conditioner or comfort fan) is connected to the mains power source and is not providing any function. Also considered as off mode are conditions providing only an indication of off mode condition, as well as conditions providing only functionalities intended to ensure electromagnetic compatibility pursuant to Directive 2004/108/EC of the European Parliament and of the Council;
- (8) ‘*Standby mode*’ means a condition where the equipment (air conditioner or comfort fan) is connected to the mains power source, depends on energy input from the mains power source to work as intended and provides only the following functions, which may persist for an indefinite time: reactivation function, or reactivation function and only an indication of enabled reactivation function, and/or information or status display;
- (9) ‘*Reactivation function*’ means a function facilitating the activation of other modes, including active mode, by remote switch including remote control, internal sensor, timer to a condition providing additional functions, including the main function;
- (10) ‘*Information or status display*’ is a continuous function providing information or indicating the status of the equipment on a display, including clocks;

- (11) ‘*Sound power level*’ means the A-weighted sound power level [dB(A)] indoors and/or outdoors measured at *standard rating conditions* for cooling (or heating, if the product has no cooling function);
- (12) ‘*Reference design conditions*’ means the combination of requirements for the *reference design temperature*, the maximum *bivalent temperature* and the maximum *operation limit temperature*, as described in Annex II, Table 3;
- (13) ‘*Reference design temperature*’ means the *outdoor temperature* [°C] for either cooling ($T_{designc}$) or heating ($T_{designh}$) as described in Annex I, Table 3, at which the *part load ratio* shall be equal to 1, and which varies according the designated cooling or heating *season*;
- (14) ‘*Part load ratio*’ ($pl(T_j)$) means the *outdoor temperature* minus 16°C, divided by the *reference design temperature* minus 16°C, for either cooling or heating;
- (15) ‘*Season*’ means one of four sets operating conditions (available for four seasons: *one cooling season, three heating seasons: average / colder / warmer*) describing per *bin* the combination of *outdoor temperatures* and the number of hours these temperatures occur per season the unit is declared fit for purpose;
- (16) ‘*Bin*’ (with index j) means a combination of an *outdoor temperature* (T_j) and *bin hours* (h_j), as described in Annex II, table 1;
- (17) ‘*Bin hours*’ means the hours per season (h_j) the *outdoor temperature* occurs for each bin, as described in Annex II, table 1;
- (18) ‘*Seasonal energy efficiency ratio*’ (*SEER*) is the overall energy efficiency ratio of the unit, representative for the whole cooling season, calculated as the *Reference annual cooling demand* divided by the *Annual electricity consumption for cooling*;
- (19) ‘*Reference annual cooling demand*’ (Q_C) means the reference cooling demand [kWh/a] to be used as basis for calculation of SEER and calculated as the product of the *design load for cooling* ($P_{designc}$) and the *equivalent active mode hours* for cooling (H_{CE});
- (20) ‘*Equivalent active mode hours for cooling*’ (H_{CE}) means the assumed annual number of hours [hrs/a] the unit must provide the *design load for cooling* ($P_{designc}$) in order to satisfy the *Reference annual cooling demand*, as described in Annex II, table 4;
- (21) ‘*Annual electricity consumption for cooling*’ (Q_{CE}) means the electricity consumption [kWh/a] required to meet the *Reference annual cooling demand* and is calculated as the *Reference annual cooling demand* divided by the *active mode energy efficiency ratio* (*SEERon*) and the electricity consumption of the unit for *thermostat off-, standby-, off- and crankcase heater-mode* during the cooling season;
- (22) ‘*Active mode energy efficiency ratio*’ (*SEERon*) means the average energy efficiency ratio of the unit in active mode for the cooling function, constructed from *part load* and *bin-specific energy efficiency ratio's* ($EER_{bin}(T_j)$) and weighted by the *bin hours* the *bin* condition occurs;

- (23) ‘*Part load*’ means the cooling load ($P_c(T_j)$) or the heating load ($P_h(T_j)$) [kW] at a specific outdoor temperature T_j , calculated as the *design load* multiplied by the *part load ratio*;
- (24) ‘*Bin-specific energy efficiency ratio*’ ($EER_{bin}(T_j)$) means the energy efficiency ratio specific for every *bin* j with *outdoor temperature* T_j in a season, derived from the *part load*, *declared capacity* and *declared energy efficiency ratio* ($EER_d(T_j)$) for specified *bins* (j) and calculated for other *bins* through inter/extrapolation, when necessary corrected by the *degradation coefficient*;
- (25) ‘*Seasonal coefficient of performance*’ ($SCOP$) is the overall coefficient of performance of the unit, representative for the whole designated heating season (the value of $SCOP$ pertains to a designated heating season), calculated as the *Reference annual heating demand* divided by the *Annual electricity consumption for heating*;
- (26) ‘*Reference annual heating demand*’ (Q_H) means the reference heating demand [kWh/a], pertaining to a designated *heating season*, to be used as basis for calculation of $SCOP$ and calculated as the product of the *design load for heating* ($P_{designh}$) and the *seasonal equivalent active mode hours for heating* (H_{HE});
- (27) ‘*Equivalent active mode hours for heating*’ (H_{HE}) means the assumed annual number of hours [hrs/a] the unit must provide the *design load for heating* ($P_{designh}$) in order to satisfy the *Reference annual heating demand*, as described in Annex II, table 4;
- (28) ‘*Annual electricity consumption for heating*’ (Q_{HE}) means the electricity consumption [kWh/a] required to meet the indicated *Reference annual heating demand* and which pertains to a designated heating season; and is calculated as the *Reference annual heating demand* divided by the *active mode coefficient of performance* ($SCOP_{on}$) and the electricity consumption of the unit for *thermostat off*-, *standby*-, *off*- and *crankcase heater-mode* during the heating season;
- (29) ‘*Active mode coefficient of performance*’ ($SCOP_{on}$) means the average coefficient of performance of the unit in active mode for the designated heating season, constructed from the *part load*, *electric back up heating capacity* (where required) and *bin-specific coefficients of performance* ($COP_{bin}(T_j)$) and weighted by the bin hours the bin condition occurs;
- (30) ‘*Electric back-up heater capacity*’ ($elbu(T_j)$) is the heating capacity [kW] of a real or assumed electric back-up heater with COP of 1 that supplements the *declared capacity for heating* ($P_{dh}(T_j)$) in order to meet the *part load for heating* ($P_h(T_j)$) in case $P_{dh}(T_j)$ is less than $P_h(T_j)$, for the *outdoor temperature* (T_j);
- (31) ‘*Bin-specific coefficient of performance*’ ($COP_{bin}(T_j)$) means the coefficient of performance specific for every *bin* j with *outdoor temperature* T_j in a season, derived from the *part load*, *declared capacity* and *declared coefficient of performance* ($COP_d(T_j)$) for specified *bins* (j) and calculated for other *bins* through inter/extrapolation, when necessary corrected by the *degradation coefficient*;
- (32) ‘*Declared capacity*’ [kW] is the capacity of the vapour compression cycle of the unit for cooling ($P_{dc}(T_j)$) or heating ($P_{dh}(T_j)$), pertaining to an outdoor temperature T_j and indoor temperature (T_{in}), as declared by the manufacturer;

- (33) ‘*Service value*’ (*SV*) [(m³/min)/W] means for comfort fans the ratio of the *maximum fan flow rate* [m³/min] and the *fan power input* [W];
- (34) ‘*Capacity control*’ means the ability of the unit to change its capacity by changing the volumetric flow rate. Units are to be indicated as ‘*fixed*’ if the unit can not change its volumetric flow rate, ‘*staged*’ if the volumetric flow rate is changed or varied in series of not more than two steps, or ‘*variable*’ if the volumetric flow rate is changed or varied in series of three or more steps;
- (35) ‘*Function*’ means the indication of whether the unit is capable of indoor air cooling, indoor air heating or both;
- (36) ‘*Design load*’ means the declared cooling load (*P_{designc}*) and/or declared heating load (*P_{designh}*) [kW] at the *reference design temperature*, whereby
- for cooling mode, *P_{designc}* is equal to the *declared capacity* for cooling at *T_j* equal to *T_{designc}* ;
- for heating mode, *P_{designh}* is equal to the *part load* at *T_j* equal to *T_{designh}*;
- (37) ‘*declared energy efficiency ratio*’ (*EER_d(T_j)*) means the energy efficiency ratio at a limited number of specified *bins* (*j*) with *outdoor temperature* (*T_j*), as declared by the manufacturer;
- (38) ‘*Declared coefficient of performance*’ (*COP_d(T_j)*) means the coefficient of performance at a limited number of specified *bins* (*j*) with *outdoor temperature* (*T_j*), as declared by the manufacturer;
- (39) ‘*Bivalent temperature*’ (*T_{biv}*) means the *outdoor temperature* (*T_j*) [°C] declared by the manufacturer for heating at which the *declared capacity* equals the *part load* and below which the *declared capacity* must be supplemented with *electric back up heater capacity* in order to meet the *part load* for heating;
- (40) ‘*Operation limit temperature*’ (*T_{ol}*) means the *outdoor temperature* [°C] declared by the manufacturer for heating, below which air conditioner will not be able to deliver any heating capacity. Below this temperature, the *declared capacity* is equal to zero;
- (41) ‘*Cycling interval capacity*’ [kW] is the (time-weighted) average of the *declared capacity* over the cycling test interval for cooling (*P_{cycc}*) or heating (*P_{cyhc}*);
- (42) ‘*Cycling interval efficiency for cooling*’ (*EER_{cycc}*) is the average energy efficiency ratio over the cycling test interval (compressor switching on and off), calculated as the integrated cooling capacity over the interval [kWh] divided by the integrated electric power input over that same interval [kWh];
- (43) ‘*Cycling interval efficiency for heating*’ (*COP_{cyhc}*) is the average coefficient of performance over the cycling test interval (compressor switching on and off), calculated as the integrated heating capacity over the interval [kWh] divided by the integrated electric power input over that same interval [kWh];

- (44) ‘*Degradation coefficient*’ is the measure of efficiency loss due to cycling (compressor switching on/off in *active mode*) established for cooling (C_{dc}), heating (C_{dh}) or chosen as default value 0.25;
- (45) ‘*Active mode*’ means the mode corresponding to the hours with a cooling or heating load of the building and whereby the cooling or heating function of the unit is activated. This condition may involve on/off-cycling of the unit in order to reach or maintain a required indoor air temperature;
- (46) ‘*Thermostat-off mode*’ means a mode corresponding to the hours with no cooling or heating load whereby the cooling or heating function of the unit is switched on but the unit is not operational as there is no cooling or heating load. This condition is therefore related to outdoor temperatures and not to indoor loads. Cycling on / off in active mode is not considered as thermostat off;
- (47) ‘*Crankcase heater operation*’ means a condition where the unit has activated a heating device to avoid the refrigerant migrating to the compressor in order to limit the refrigerant concentration in oil at compressor start;
- (48) ‘*Thermostat-off mode power consumption*’ (P_{TO}) means the power consumption of the unit [kW] while in *thermostat-off* mode;
- (49) ‘*Standby mode power consumption*’ (P_{SB}) means the power consumption of the unit [kW] while in *standby* mode;
- (50) ‘*Off-mode power consumption*’ (P_{OFF}) means the power consumption of the unit [kW] while in *off-mode*;
- (51) ‘*Crankcase heater mode power consumption*’ (P_{CK}) means the power consumption of the unit [kW] while in *crankcase heater operation* mode;
- (52) ‘*Thermostat-off mode operating hours*’ (H_{TO}) means the annual number of hours [hrs/a] the unit is considered to be in *thermostat-off* mode, the value of which depends on the designated season and function;
- (53) ‘*Standby mode operating hours*’ (H_{SB}) means the annual number of hours [hrs/a] the unit is considered to be in *standby* mode, the value of which depends on the designated season and function;
- (54) ‘*Off-mode operating hours*’ (H_{OFF}) means the annual number of hours [hrs/a] the unit is considered to be in *off-mode*, the value of which depends on the designated season and function;
- (55) ‘*Crankcase heater mode operating hours*’ (H_{CK}) means the annual number of hours [hrs/a] the unit is considered to be in *crankcase heater operation* mode, the value of which depends on the designated season and function;
- (56) ‘*Nominal air flow rate*’ means the air flow rate [m³/h] measured at the air outlet of indoor and/or outdoor units (if applicable) of air conditioners at *standard rating conditions* for cooling (or heating, if the product has no cooling function);

- (57) ‘*Rated power input for cooling*’ (P_{EER}) means the electric power input [kW] of a unit when providing cooling at *standard rating conditions*;
- (58) ‘*Rated power input for heating*’ (P_{COP}) means the electric power input [kW] of a unit when providing heating at *standard rating conditions*;
- (59) ‘*Electricity consumption of single / double ducts*’ (Q_{SD} respectively Q_{DD}) means the electricity consumption of single or double duct air conditioners for the cooling and/or heating mode (whichever applies) [single duct in kWh/h, double duct in kWh/a];
- (60) ‘*Maximum fan flow rate*’ (F) means the air flow rate of the comfort fan at its maximum setting [m³/min], measured at the fan outlet with the *oscillating mechanism* (if applicable) turned off;
- (61) ‘*Oscillating mechanism*’ means the capability of the comfort fan to automatically vary the direction of the air flow while the fan is operating;
- (62) ‘*Fan sound power level*’ means the A-weighted sound power level of the comfort fan while providing the *maximum fan flow rate*, measured at the outlet side;
- (63) ‘*Fan active mode hours*’ (H_{CE}) means the number of hours [hrs/a] the comfort fan is assumed to provide the *maximum fan flow rate*, as described in Annex II, Table 10.

2. REQUIREMENTS FOR MINIMUM ENERGY EFFICIENCY, MAXIMUM POWER CONSUMPTION IN OFF-MODE AND STANDBY MODE AND FOR MAXIMUM SOUND POWER LEVEL

- a) From 1 January 2012, single ducts and double ducts shall correspond to requirements as indicated in below table, calculated in accordance with Annex II. The requirements on minimum energy efficiency and maximum sound power shall relate to the standard rating conditions specified in Annex II, Table 2.

	Double ducts		Single ducts	
	EER _{rated}	COP _{rated}	EER _{rated}	COP _{rated}
If GWP of refrigerant > 150	2,40	2,36	2,40	1,80
If GWP of refrigerant < 150	2,16	2,12	2,16	1,62

Table 2. Requirements for maximum power consumption in off-mode and standby mode

Off mode	Power consumption of equipment in any off-mode condition shall not exceed 1,00 W.
Standby mode	The power consumption of equipment in any condition providing only a reactivation function, or providing only a reactivation function and a mere indication of enabled reactivation function, shall not exceed 1,00 W.
	The power consumption of equipment in any condition providing only information or status display, or providing only a combination of reactivation function and information or status display, shall not exceed 2,00 W.
Availability of standby and/or off mode	Equipment shall, except where this is inappropriate for the intended use, provide off mode and/or standby mode, and/or another condition which does not exceed the applicable power consumption requirements for off mode and/or standby mode when the equipment is connected to the mains power source.

Table 3. Requirements for maximum sound power level

Indoor sound power level in dB(A)
65

b. From 1 July 2012, air conditioners, except single and double ducts, shall correspond to minimum energy efficiency and maximum sound power level requirements as indicated in below tables, calculated in accordance with Annex II. The requirements on energy efficiency shall take into account the reference design conditions specified in Annex II, Table 3 using the 'Average' heating season where applicable. The requirements on sound power shall relate to the standard rating conditions specified in Annex II, Table 2

Table 4. Requirements for minimum energy efficiency

	SEER	SCOP (Average heating season)
If GWP of refrigerant > 150	3,60	3,20
If GWP of refrigerant < 150	3,24	2,88

Table 5. Requirements for maximum sound power level

Rated capacity ≤ 6 kW		6 < Rated capacity ≤ 12 kW	
Indoor sound power level in dB(A)	Outdoor sound power level in dB(A)	Indoor sound power level in dB(A)	Outdoor sound power level in dB(A)
60	65	65	70

- c. From 1 January 2014, air conditioners shall correspond to requirements as indicated in the below table, calculated in accordance with Annex II. The requirements on energy efficiency for air conditioners, excluding single and double ducts, shall relate to the reference design conditions specified in Annex II, Table 3 using the 'Average' heating season where applicable. The requirements on energy efficiency for single and double ducts shall relate to the standard rating conditions specified in Annex II, Table 2.

	Air conditioners, except double ducts and single ducts		Double ducts		Single ducts	
	SEER	SCOP (heating season: Average)	EER _{rated}	COP _{rated}	EER _{rated}	COP _{rated}
If GWP of refrigerant > 150	4,30	3,50	2,60	2,60	2,60	2,04
If GWP of refrigerant ≤ 150	3,87	3,15	2,34	2,34	2,34	1,84

Single ducts shall be named 'local air conditioners' in packaging, product documentation and in any advertisement material, whether electronic or in paper.

- d. From 1 January 2014, single ducts and double ducts shall correspond to requirements as indicated in below table, calculated in accordance with Annex II.

Off mode	Power consumption of equipment in any off-mode condition shall not exceed 0,50 W.
Standby mode	The power consumption of equipment in any condition providing only a reactivation function, or providing only a reactivation function and a mere indication of enabled reactivation function, shall not exceed 0,50 W.
	The power consumption of equipment in any condition providing only information or status display, or providing only a combination of reactivation function and information or status display shall not exceed 1,00 W.
Availability of standby and/or off mode	Equipment shall, except where this is inappropriate for the intended use, provide off mode and/or standby mode, and/or another condition which does not exceed the applicable power consumption requirements for off mode and/or standby mode when the equipment is connected to the mains power source.
Power management	When equipment is not providing the main function, or when other energy-using product(s) are not dependent on its functions, equipment shall, unless inappropriate for the intended use, offer a power management function, or a similar function, that switches equipment after the shortest possible period of time appropriate for the intended use of the equipment, automatically into: <ul style="list-style-type: none"> — standby mode, or — off mode, or — another condition which does not exceed the applicable power consumption requirements for off mode and/or standby mode when the equipment is connected to the mains power source. The power management function shall be activated before delivery.

3. PRODUCT INFORMATION REQUIREMENTS

- (a) From 1 July 2012, on air conditioners and comfort fans, the information set out in points below and calculated in accordance with Annex II shall be visibly displayed on:
- i) the technical documentation of the product;
 - ii) free access websites of manufacturers of air conditioners and comfort fans;
- (b) The manufacturer of air conditioners and comfort fans shall provide laboratories performing compliance checks, upon request, the necessary information on the setting of the unit as applied for the establishment of *declared capacities*, *SEER/EER*, *SCOP/COP* values and *service values* and provide contact information for obtaining such information.
- (c) Information requirements for air conditioners, except double ducts and single ducts.

Table 1. Information requirements											
(the number of digits in the box indicates the precision of reporting)											
Information to identify the model(s) to which the information relates to:											
Function (indicate if present)					If function includes heating: Indicate the heating season the information relates to. Indicated values should relate to one heating season at a time. Include at least the heating season 'Average'.						
										cooling	
heating		Y/N			Warmer (if designated)		Y/N				
					Colder (if designated)		Y/N				
Item	symbol	value	unit	Item	symbol	value	unit	Item	symbol	value	unit
Design load				Seasonal efficiency							
cooling	Pdesignc	x,x	kW	cooling	SEER	x,x	-	heating / Average	SCOP/A	x,x	-
heating / Average	Pdesignh	x,x	kW	heating / Average	SCOP/W	x,x	-	heating / Warmer	SCOP/W	x,x	-
heating / Warmer	Pdesignh	x,x	kW	heating / Colder	SCOP/C	x,x	-				
heating / Colder	Pdesignh	x,x	kW								
Declared capacity* for cooling, at indoor temperature 27(19)°C and outdoor temperature Tj				Declared Energy efficiency ratio* for cooling, at indoor temperature 27(19)°C and outdoor temperature Tj							
Tj=35°C	Pdc	x,x	kW	Tj=35°C	EERd	x,x	-	Tj=30°C	EERd	x,x	-
Tj=30°C	Pdc	x,x	kW	Tj=30°C	EERd	x,x	-	Tj=25°C	EERd	x,x	-
Tj=25°C	Pdc	x,x	kW	Tj=25°C	EERd	x,x	-	Tj=20°C	EERd	x,x	-
Tj=20°C	Pdc	x,x	kW								
Declared capacity* for heating / Average climate, at indoor temperature 20°C and outdoor temperature Tj				Declared Coefficient of performance* for heating / Average climate, at indoor temperature 20°C and outdoor temperature Tj							
Tj=-7°C	Pdh	x,x	kW	Tj=-7°C	COPd	x,x	-	Tj=2°C	COPd	x,x	-
Tj=2°C	Pdh	x,x	kW	Tj=2°C	COPd	x,x	-	Tj=7°C	COPd	x,x	-
Tj=7°C	Pdh	x,x	kW	Tj=7°C	COPd	x,x	-	Tj=12°C	COPd	x,x	-
Tj=12°C	Pdh	x,x	kW	Tj=12°C	COPd	x,x	-	Tj=bivalent temperature	COPd	x,x	-
Tj=bivalent temperature	Pdh	x,x	kW	Tj=bivalent temperature	COPd	x,x	-	Tj=operating limit	COPd	x,x	-
Tj=operating limit	Pdh	x,x	kW								
Declared capacity* for heating / Warmer climate, at indoor temperature 20°C and outdoor temperature Tj				Declared Coefficient of performance* / Warmer climate, at indoor temperature 20°C and outdoor temperature Tj							
Tj=2°C	Pdh	x,x	kW	Tj=2°C	COPd	x,x	-	Tj=7°C	COPd	x,x	-
Tj=7°C	Pdh	x,x	kW	Tj=7°C	COPd	x,x	-	Tj=12°C	COPd	x,x	-
Tj=12°C	Pdh	x,x	kW	Tj=12°C	COPd	x,x	-	Tj=bivalent temperature	COPd	x,x	-
Tj=bivalent temperature	Pdh	x,x	kW	Tj=bivalent temperature	COPd	x,x	-	Tj=operating limit	COPd	x,x	-
Tj=operating limit	Pdh	x,x	kW								

Declared capacity* for heating / Colder climate, at indoor temperature 20°C and outdoor temperature Tj				Declared Coefficient of performance* / Colder climate, at indoor temperature 20°C and outdoor temperature Tj			
Tj=-7°C	Pdh	x,x	kW	Tj=-7°C	COPd	x,x	-
Tj=2°C	Pdh	x,x	kW	Tj=2°C	COPd	x,x	-
Tj=7°C	Pdh	x,x	kW	Tj=7°C	COPd	x,x	-
Tj=12°C	Pdh	x,x	kW	Tj=12°C	COPd	x,x	-
Tj=bivalent temperature	Pdh	x,x	kW	Tj=bivalent temperature	COPd	x,x	-
Tj=operating limit	Pdh	x,x	kW	Tj=operating limit	COPd	x,x	-
Tj=-15°C	Pdh	x,x	kW	Tj=-15°C	COPd	x,x	-
Bivalent temperature				Operating limit temperature			
heating / Average	Tbiv	x	°C	heating / Average	Tol	x	°C
heating / Warmer	Tbiv	x	°C	heating / Warmer	Tol	x	°C
heating / Colder	Tbiv	x	°C	heating / Colder	Tol	x	°C
Cycling interval capacity				Cycling interval efficiency			
for cooling	Pcycc	x,x	kW	for cooling	EERcyc	x,x	-
for heating	Pcyhc	x,x	kW	for heating	COPcyc	x,x	-
Degradation co-efficient heating**				Degradation co-efficient heating**			
	Cdc	x,x	-		Cdh	x,x	-
Electric power input in power modes other than 'active mode'				Annual electricity consumption			
off mode	P _{OFF}	x,x	kW	cooling	Q _{CE}	x	kWh/a
standby mode	P _{SB}	x,x	kW	heating / Average	Q _{HE}	x	kWh/a
thermostat-off mode	P _{TO}	x,x	kW	heating / Warmer	Q _{HE}	x	kWh/a
crankcase heater mode	P _{CK}	x,x	kW	heating / Colder	Q _{HE}	x	kWh/a
Capacity control (indicate one of three options)				Other items			
fixed	Y/N			Sound power level (indoor/outdoor)	L _{WA}	x,x / x,x	dB(A)
staged	Y/N			Global warming potential	GWP	x	kgCO ₂ eq.
variable	Y/N			Rated air flow (indoor/outdoor)	-	x / x	m ³ /h
Contact details for obtaining more information	Name, position, postal address, e-mail address and, telephone number.						
* = For staged capacity units, two values divided by a slash ('/') will be declared in each box in the section "Declared capacity of the unit" and "declared EER/COP" of the unit.							
** = If default Cd=0,25 is chosen then (results from) cycling tests are not required. Otherwise either the heating or cooling cycling test value is required.							

In as much as is relevant in view of the functionality, the manufacturer shall supply the information as requested in the below table in the technical documentation of the product. For units with *capacity control* marked 'staged', two values for the highest and lowest, noted 'hi/lo' divided by a slash ('/') will be declared in each box under "Declared capacity".

(d) Information requirements for single ducts and double ducts.

Manufacturer shall provide information as detailed in below table.

Table 2. Information requirements			
Information to identify the model(s) to which the information relates to <i>[fill in as necessary]</i>			
Description	Symbol	Value	Unit
Rated capacity for cooling	P_{rated} for cooling	$[x,x]$	kW
Rated capacity for heating	P_{rated} for heating	$[x,x]$	kW
Rated power input for cooling	P_{EER}	$[x,x]$	kW
Rated power input for heating	P_{COP}	$[x,x]$	kW
Rated Energy efficiency ratio	$EERd$	$[x,x]$	-
Rated Coefficient of performance	$COPd$	$[x,x]$	-
Power consumption in thermostat-off mode	P_{TO}	$[x,x]$	W
Power consumption in standby mode	P_{SB}	$[x,x]$	W
Electricity consumption of single/double duct appliances (indicate for cooling and heating separately)	$DD: Q_{DD}$ $SD: Q_{SD}$	$DD: [x]$ $SD: [x,x]$	DD: kWh/a SD: kWh/h
Sound power level	L_{WA}	$[x]$	dB(A)
Contact details for obtaining more information	Name, position, postal address, e-mail address and, telephone number.		

(e) Information requirements for comfort fans.

Manufacturer shall provide information as detailed in below table.

Table 3. Information requirements			
Information to identify the model(s) to which the information relates to <i>[fill in as necessary]</i>			
Description	Symbol	Value	Unit
Maximum fan flow rate	F	$[x,x]$	m ³ /min
Fan power input	P	$[x,x]$	W
Service value	SV	$[x,x]$	(m ³ /min)/W
Standby power consumption	P_{SB}	$[x,x]$	W
Fan sound power level	L_{WA}	$[x]$	dB(A)
Measurement standard for service value	[state here the reference to measurement standard used]		
Contact details for obtaining more information	Name, position, postal address, e-mail address and, telephone number.		

ANNEX II

Measurements and calculations

For the purposes of compliance and verification of compliance with the requirements of this Regulation, measurements and calculations shall be made using a reliable, accurate and reproducible method, which takes into account the generally recognised state of the art methods, and whose results are deemed to be of low uncertainty, including methods set out in documents the reference numbers of which have been published for that purpose in the Official Journal of the European Union. They shall fulfil all of the following technical parameters.

The determination of the seasonal energy consumption and efficiency for cooling (SEER) and heating (SCOP) shall take into account:

- European cooling and heating season(s), as defined in Table 1 below;
- Reference design conditions, as defined in Table 3 below;
- Electric energy consumption for all relevant modes of operation, using time periods as defined in Table 4 below;
- Effects of the degradation of the energy efficiency caused by on/off cycling (if applicable) depending on the type of control of the cooling and/or heating capacity;
- Corrections on the momentary energy efficiency ratios or coefficients of performance depending on the ratio of the cooling and/or heating load over the declared cooling and/or heating capacity at the same temperature conditions;
- The contribution of a back-up heater (if applicable) in the calculation of the seasonal efficiency of a unit in heating mode.

Where the information relating to a specific model, being a combination of indoor and outdoor unit(s), has been obtained by calculation on the basis of design, and/or extrapolation from other combinations, the documentation should include details of such calculations and/or extrapolations, and of tests undertaken to verify the accuracy of the calculations undertaken (including details of the mathematical model for calculating performance of such combinations, and of measurements taken to verify this model).

The cooling efficiency (EER_{rated}) and, when applicable, heating efficiency (COP_{rated}) for double ducts and single ducts shall be established at the standard rating conditions as defined in Table 2, Annex II.

The calculation of seasonal electricity consumption for cooling (and/or heating) shall take into account electric energy consumption of all relevant modes of operation, using time periods as defined in table 3, Annex II.

The comfort fan efficiency shall be determined on the basis of the nominal air flow rate of the unit divided by the nominal electric power input of the unit.

Table 1. Cooling and heating season bins (j=bin index, Tj=outdoor temperature, hj=hours per annum per bin) where db=dry bulb temperature, wb=wet bulb temperature

COOLING SEASON			HEATING SEASON				
j #	Tj °C db	hj hrs/annum	j #	Tj °C db	hj hrs/annum Average	Warmer	Colder
1	17	205	1 to 8	-30 to -23	0	0	0
2	18	227	9	-22	0	0	1
3	19	225	10	-21	0	0	6
4	20	225	11	-20	0	0	13
5	21	216	12	-19	0	0	17
6	22	215	13	-18	0	0	19
7	23	218	14	-17	0	0	26
8	24	197	15	-16	0	0	39
9	25	178	16	-15	0	0	41
10	26	158	17	-14	0	0	35
11	27	137	18	-13	0	0	52
12	28	109	19	-12	0	0	37
13	29	88	20	-11	0	0	41
14	30	63	21	-10	1	0	43
15	31	39	22	-9	25	0	54
16	32	31	23	-8	23	0	90
17	33	24	24	-7	24	0	125
18	34	17	25	-6	27	0	169
19	35	13	26	-5	68	0	195
20	36	9	27	-4	91	0	278
21	37	4	28	-3	89	0	306
22	38	3	29	-2	165	0	454
23	39	1	30	-1	173	0	385
24	40	0	31	0	240	0	490
			32	1	280	0	533
			33	2	320	3	380
			34	3	357	22	228
			35	4	356	63	261
			36	5	303	63	279
			37	6	330	175	229
			38	7	326	162	269
			39	8	348	259	233
			40	9	335	360	230
			41	10	315	428	243
			42	11	215	430	191
			43	12	169	503	146
			44	13	151	444	150
			45	14	105	384	97
			46	15	74	294	61
Total hrs.			Total hrs.		4910	3590	6446

Table 2. Standard rating conditions, temperatures in 'dry bulb' air temperature ('wet bulb' indicated in brackets)

Appliance	Function	Indoor air temperature	Outdoor air temperature
air conditioners, excluding single duct	cooling	27 (19)	35 (24)
	heating	20 (max. 15)	7(6)
single duct	cooling	35 (24)	35 (24) *
	heating	20 (12)	20 (12) *

* In case of single ducts the condensor (evaporator) when cooling (heating) is not supplied with outdoor air, but indoor air.

Table 3. Reference design conditions, temperatures in 'dry bulb' air temperature ('wet bulb' indicated in brackets)

Function / season	Indoor air temperature (°C)	Outdoor air temperature	Bivalent temperature (°C)	Operating limit temperature (°C)
	T _{in}	T _{designc} /T _{designh}	T _{biv}	T _{ol}
cooling	27 (19)	T _{designc} = 35 (24)	n.a.	n.a.
heating / Average		T _{designh} = -10 (-11)	max. 2	max. -7
heating / Warmer	20 (15)	T _{designh} = 2 (1)	max. 7	max. 2
heating / Colder		T _{designh} = -22 (-23)	max. -7	max. -15

Table 4. Operational hours per type of appliance per functional mode to be used for calculation of electricity consumption

Type of appliance / functionality (if applicable)	Unit	Heating season	On mode	Thermostat-off mode	Standby mode	Off mode	Crankcase heater mode
			cooling: H_{CE} heating: H_{HE}	H_{TO}	H_{SB}	H_{OFF}	H_{CK}
Air conditioners, except double ducts and single duct							
Cooling mode, if appliance offers cooling only	hrs/year		350	221	2142	5088	7760
Cooling and heating modes, if appliance offers both modes	Cooling mode	hrs/year	350	221	2142	0	2672
	Heating mode	hrs/year	Average	1400	179	0	179
			Warmer	1400	755	0	755
			Colder	2100	131	0	131
Heating mode, if appliance offers heating only	hrs/year	Average	1400	179	0	3672	3851
		Warmer	1400	755	0	2189	2944
		Colder	2100	131	0	4345	4476
Double duct							
			cooling: H_{CE} heating: H_{HE}	H_{TO}	H_{SB}	H_{OFF}	H_{CK}
Cooling mode, if appliance offers cooling only	hrs/year		350	221	2142	5088	7760
Cooling and heating modes, if appliance offers both modes	Cooling mode	hrs/year	350	221	2142	0	2672
	Heating mode	hrs/year	1400	179	0	0	179
Heating mode, if appliance offers heating only	hrs/year		1400	179	0	3672	3851
Single duct							
			cooling: H_{CE} heating: H_{HE}	H_{TO}	H_{SB}	H_{OFF}	H_{CK}
Cooling mode	hrs/h		1	n/a	n/a	n/a	n/a
Heating mode	hrs/h		1	n/a	n/a	n/a	n/a

ANNEX III

Verification procedure for market surveillance purposes

When performing the market surveillance checks referred to in Article 3 (2) of Directive 2009/125/EC, the authorities of the Member States shall apply the following verification procedure for the requirements set out in Annex I.

1. The authorities of the Member State shall test one single unit.
2. The air conditioner model, except single and double ducts, shall be considered to comply with the provisions set out in Annex I, as applicable, to this Regulation, if its seasonal efficiency for cooling (SEER) is not less than the target value minus 8% and, if applicable, if the seasonal efficiency for heating (SCOP) is not less than the target value minus 8%, established in accordance with Annex II.

The model of a single and double duct shall be considered to comply with the provisions set out in Annex I, as applicable, to this Regulation, if the results for off-mode and standby-mode conditions do not exceed the limit values by more than 10 %, and if the efficiency for cooling (EER_{rated}) is not less than the target value minus 10% and, if applicable, if the efficiency for heating (COP_{rated}) is not less than the target value minus 10%, established in accordance with Annex II.

The air conditioner model shall be considered to comply with the provisions set out in this Regulation, as applicable, if the maximum sound power level does not exceed more than 2 dB(A) of the target value.

3. If the result referred to in point 2 is not achieved, the market surveillance authority shall randomly select three additional units for testing.
4. The air conditioner model, except single and double ducts, shall be considered to comply with the provisions set out in Annex I, as applicable, to this Regulation, if its seasonal efficiency for cooling (SEER) is not less than the target value minus 8% and, if applicable, if the seasonal efficiency for heating (SCOP) is not less than the target value minus 8%, established in accordance with Annex II.

The model of a single and double duct shall be considered to comply with the provisions set out in Annex I, as applicable, to this Regulation, if the results for off-mode and standby-mode conditions do not exceed the limit values by more than 10 %, and if the efficiency for cooling (EER_{rated}) is not less than the target value minus 10% and, if applicable, if the efficiency for heating (COP_{rated}) is not less than the target value minus 10%, established in accordance with Annex II.

The air conditioner model shall be considered to comply with the provisions set out in this Regulation, as applicable, if the maximum sound power level does not exceed more than 2 dB(A) of the target value.

5. If the results referred to in point 4 are not achieved, the model shall be considered not to comply with this Regulation.

For the purposes of checking conformity with the requirements of this Regulation, Member States shall apply the procedures referred to in Annex II, and reliable, accurate and reproducible calculation and measurement methods, which take into account the generally recognised state-of-the-art, including methods set out in documents the references and reference numbers of which have been published for that purpose in the Official Journal of the European Union.

ANNEX IV
Benchmarks

At the time of entry into force of this Regulation, the best available technology on the market for air conditioners in terms of their energy performance was identified as follows:

Benchmarks for air conditioners:

Benchmarks for air conditioners					
Air conditioners, excluding double ducts and single ducts		Double ducts		Single ducts	
SEER	SCOP	EER	COP	EER	COP
7,0	5,1	3,00 *	3,15	3.15 *	2,60

* Based on efficiency of evaporatively cooled single ducts.