

**Implementing Directive 2009/125/EC of the European Parliament and of the Council  
with regard to Ecodesign requirements for vacuum cleaners**

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 products<sup>1</sup>, 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 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 an implementing measure for domestic appliances, including vacuum cleaners.
- (3) The Commission has carried out a preparatory study to analyse the technical, environmental and economic aspects of vacuum cleaners typically used in households and commercial premises. The study has been developed together with stakeholders and interested parties from the Community and third countries, and the results have been made publicly available.
- (4) Wet, wet and dry, robot, industrial, central and battery operated vacuum cleaners, and floor polishers have particular characteristics and should therefore be exempted from the scope of this working document.
- (5) The environmental aspects of the products covered, identified as significant for the purposes of this working document, are energy consumption in the use phase, dust re-emission and noise (sound power level). The annual electricity consumption of products subject to this working document was estimated to have been 18 TWh in the Community in 2005. Unless specific measures are taken, annual electricity consumption is predicted to be 34 TWh in 2020. The preparatory study shows that the energy consumption of products subject to this working document can be significantly reduced.
- (6) The preparatory study shows that requirements regarding other Ecodesign parameters as referred to in Annex I, Part 1, to Directive 2009/125/EC are not necessary, as energy

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<sup>1</sup> OJ L 285, 31.10.2009, p. 10–35

consumption in the use phase, the health benefits of vacuum cleaners, and in particular their removal of small particulates from the indoor environment and noise (sound power level) are important. In accordance with Article 6(2) of Directive 2009/125/EC, Member States shall not prohibit, restrict or impede the placing on the market and/or putting into service, within their territories, of household tumble driers on grounds of ecodesign requirements relating to those ecodesign parameters referred to in Annex I, Part 1, of that Directive for which this working document provides that no ecodesign requirement is necessary.

- (7) The energy consumption of products subject to this working document should be made more efficient by applying existing non-proprietary cost-effective technologies that can reduce the combined costs of purchasing and operating these products.
- (8) 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 energy consumption during the use phase should more than offset any additional environmental impacts during the production phase and the disposal.
- (9) The Ecodesign requirements should be introduced gradually in order to provide a sufficient timeframe for manufacturers to re-design products subject to this working document. 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 working document.
- (10) 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<sup>2</sup>.
- (11) In accordance with Article 8 of Directive 2009/125/EC, this working document should specify the applicable conformity assessment procedures.
- (12) 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 working document.
- (13) In addition to the legally binding requirements laid down in this working document, 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 working document.
- (14) The measures provided for in this working document are in accordance with the opinion of the Committee established by Article 19(1) of Directive 2009/125/EC,

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<sup>2</sup> OJ L 204, 21.7.1998, p. 37.

HAS ADOPTED THIS working document:

## *Chapter 1*

### *Subject matter and scope*

- a) This working document establishes eco-design requirements for the placing on the market of electric mains-operated vacuum cleaners that are placed on the market after *[date to be inserted: 12 months after entry into force of the delegated working document]*.
- b) This working document shall not apply to:
  - wet, wet and dry, battery operated, robot, industrial, or central vacuum cleaners; nor to:
  - floor polishers.

## *Chapter 2*

### *Definitions*

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

- c) “vacuum cleaner” means an appliance that removes soil from a surface to be cleaned by means of an airflow created by a vacuum developed within the unit. The material thus removed is separated in the appliance and the cleaned suction air is returned;
- d) “dry vacuum cleaner” means a vacuum cleaner designed to remove soil that is principally dry (dust, fibre, threads), including but not limited to types equipped with a battery operated active nozzle;
- e) “wet and dry vacuum cleaner” means a vacuum cleaner designed to remove a significant volume, of more than 2.5 litres, of liquid, possibly in combination with the functionality of a dry vacuum cleaner;
- f) “wet vacuum cleaner” means an electrically operated appliance that removes dry and/or wet material (soil) from the surface by applying water-based detergent or steam to the surface to be cleaned, and removing this, and the soil by an airflow created by a vacuum developed within the unit. The material thus removed is separated in the appliance and cleaned suction air is returned to the ambient. wet vacuum cleaner includes but is not limited to types commonly known as spray-extraction vacuum cleaners, scrubber-driers and sweeping machines;
- g) “floor polisher” means an electrical appliance that is designed to protect, smoothen and/or render shiny certain types of floors, usually operated in combination with a polishing means to be rubbed on the floor by the appliance and commonly also equipped with the auxiliary functionality of a vacuum cleaner;
- h) “water filter vacuum cleaner” means a dry vacuum cleaner that uses more than 1 litre of water as the main filter medium, whereby the suction air is forced through the water entrapping the removed dry material as it passes through;
- i) “battery operated vacuum cleaner” means a vacuum cleaner powered only by batteries;

- j) “hybrid vacuum cleaners” means a vacuum cleaner that can be fully powered by the electric mains, batteries or both electric mains and batteries;
- k) “robot vacuum cleaner” means a battery operated vacuum cleaner that is capable of operating without human intervention within a defined perimeter, consisting of a mobile part and a docking station and/or other accessories to assist its operation.
- l) “central vacuum cleaner” means a vacuum cleaner with a fixed (not movable) vacuum source location. The hose connections are located at fixed positions in the building;
- m) “household vacuum cleaner” means a vacuum cleaner intended for use in households or domestic situations, declared by the manufacturer as such in the Declaration of Conformity (DoC) pertaining to the 'Low Voltage Directive'<sup>3</sup> (LVD);
- n) “commercial vacuum cleaner” means a vacuum cleaner for professional housekeeping purposes and intended to be used by laymen, cleaning staff or contracting cleaners in office, shop, hospital and hotel environments, declared by the manufacturer as such in the Declaration of Conformity (DoC) pertaining to the Machinery Directive<sup>4</sup> (MD);
- o) “industrial vacuum cleaner”: means a commercial vacuum cleaner designed to be part of a production process. For the purpose of this working document vacuum cleaners:
- designed for cleaning hazardous material, or as part of an industrial machine or tool, or
  - with a head width exceeding 50 cm
- shall also be considered as “industrial vacuum cleaners”;
- p) “hard floor vacuum cleaner” means a vacuum cleaner supplied without any nozzle which is designed or suitable for use on carpets and without an option for mounting said nozzle;
- q) “carpet vacuum cleaner” means a vacuum cleaner supplied without any nozzle which is designed or suitable for use on hard floors and without an option for mounting said nozzle;
- r) “general purpose vacuum cleaner” means a vacuum cleaner suitable for cleaning both carpets and hard floors;
- s) “dust re-emission” is the ratio of the number of dust particles of a specific particle size emitted by a vacuum cleaner to the number of dust particles of the same particle size entering the suction inlet when fed with dust of a specific amount and particle size while the vacuum cleaner is operating at its maximum power setting. The value includes not only dust measured at the vacuum cleaner outlet but also dust emitted elsewhere either from leaks, or generated by the vacuum cleaner (e.g. from brushes in the motor);
- t) “equivalent vacuum cleaner” means a model of vacuum cleaner placed on the market with the same input power, technical and performance characteristics, energy consumption, filtration efficiency and airborne acoustical noise as another model of

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<sup>3</sup> Directive 2006/95/EC of the European Parliament and of the Council of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits *OJ L 374, 27.12.2006, p. 10–19*

<sup>4</sup> Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC (recast) (Text with EEA relevance) *OJ L 157, 9.6.2006, p. 24–86*

vacuum cleaner placed on the market under a different commercial code number by the same manufacturer;

- u) “battery operated active nozzle” means a cleaning head provided with an agitation device powered by batteries to assist dirt removal.

### *Chapter 3*

#### ***Ecodesign requirements***

- a) The Ecodesign requirements for vacuum cleaners are set out in Annex I. They shall apply in accordance with the following timetable:  
From 1 January 2014: As indicated in Annex I, point 1.1  
From 1 January 2016: As indicated in Annex I, point 1.2
- b) Compliance with Ecodesign requirements shall be measured and calculated in accordance with the requirements set out in Annex II.

### *Chapter 4*

#### ***Conformity assessment***

- a) The conformity assessment procedure referred to in Chapter 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.
- b) For the purposes of conformity assessment pursuant to Chapter 8 of Directive 2009/125/EC, the technical documentation file shall contain a copy of the calculation set out in Annex II to this working document.

Where the information included in the technical documentation for a particular vacuum cleaner model has been obtained by calculation on the basis of design, or extrapolation from other equivalent vacuum cleaners, or both, the technical documentation shall include details of such calculations or extrapolations, or both, and of tests undertaken by manufacturers to verify the accuracy of the calculations undertaken. In such cases, the technical documentation shall also include a list of all other equivalent vacuum cleaner models where the information included in the technical documentation was obtained on the same basis.

### *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 working document, the Member States authorities shall apply the verification procedure described in Annex III to this working document.

## *Chapter 6*

### ***Indicative Benchmarks***

The indicative benchmarks for best-performing vacuum cleaners available on the market at the time of entry into force of this working document are set out in Annex IV.

## *Chapter 7*

### ***Revision***

The Commission shall review this working document 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 verification tolerances set out in Annex III.

## *Chapter 8*

### ***Entry into force***

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

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

Done at Brussels,

*For the Commission*

## ANNEX I

### ECODESIGN REQUIREMENTS

For the calculation of Energy Efficiency and dust removal ability, the standard cleaning cycles on a test carpet and on a standard hard floor with crevice shall be used.

#### 1. Specific Ecodesign requirements

Vacuum cleaners shall comply with the following requirements:

- a) From 1 January 2014:
  - annual energy consumption shall be less than 62 kWh/year. This limit shall not apply to water filter vacuum cleaners;
  - rated input power shall be less than 1600W;
  - $dpu_c$  (dust pick up on carpet) shall be greater than or equal to 65%
  - $dpu_{hf}$  (dust pick up on hard floor) shall be greater than or equal to 95%
- b) From 1 January 2016:
  - annual energy consumption shall be less than 44 kWh/year;
  - rated input power shall be less than 1200W;
  - $dpu_c$  (dust pick up on carpet) shall be greater than or equal to 65%
  - $dpu_{hf}$  (dust pick up on hard floor) shall be greater than or equal to 95%
  - dust re-emission shall be no more than 2%;
  - sound power level (weighted average level) shall be less than or equal to 77 dB (re 1pW)

The annual energy consumption, rated input power,  $dpu_c$  (dust pick up on carpet),  $dpu_{hf}$  (dust pick up on hard floor), dust re-emission, and noise power is measured and calculated in accordance with Annex II.

#### 2. Information to be provided by manufacturers

The technical documentation, booklet of instructions and free access websites of manufacturers, their authorised representatives, or importers shall contain the following elements:

- a) Any information required to be published in respect of the vacuum cleaner under any delegated acts adopted under Directive 2010/30/EU<sup>5</sup>;
- b) Short Title or Reference to the measurement and calculation methods used to establish compliance with the above requirements;
- c) information relevant for disassembly, recycling or disposal at end-of-life;
- d) for 'hard floor' vacuum cleaners, mention that they are not suitable for use on carpets;
- e) for 'carpet' vacuum cleaners, mention that they are not suitable for use on hard floors.

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<sup>5</sup> Directive 2010/30/EU of the European Parliament and of the Council of 19 May 2010 on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products (Text with EEA relevance ), *OJ L 153, 18.6.2010, p. 1–12*

## ANNEX II

### MEASUREMENT AND CALCULATION METHODS

For the purposes of compliance and verification of compliance with the requirements of this working document, measurements and calculations shall be made using a reliable, accurate and reproducible method, which takes into account the generally recognised state of the measurement and calculation methods, including methods set out in documents the reference numbers of which have been published for the purpose in the Official Journal of the European Union.

These methods and calculations shall:

- Comply with the technical definitions, equations and other aspects contained in this working document, in particular this Annex; and either
- Follow an interim measurement and calculation method published for the purpose in the Official Journal of the European Union; or
- Follow methods for which the reference numbers have been published referred to in point 1 above.

#### 3. **Technical definitions**

- a) “dust pick up” (dpu) is the ratio of the mass of the artificial dust removed after a number of double strokes of the cleaning head to the mass of artificial dust initially applied to a test area and is defined for carpet vacuum cleaners ( $dpu_c$ ), where it is the average dpu from the 3 cleaning cycles in the carpet test corrected for the specific test carpet conditions, and hard floor vacuum cleaners ( $dpu_{hf}$ ), where it is the average dpu from the 3 cleaning cycles in the hard floor test;
- b) “double stroke” (ds) is one forward and one backward movement of the cleaning head in a parallel pattern, performed at a uniform test stroke-speed and with a specified test stroke-length;
- c) “test stroke speed” ( $v_{tst}$ ) in m/h is the appropriate cleaning head speed for testing, preferably realized with an electromechanical operator. Products with self-propelled cleaning heads shall try to come as close as possible to the appropriate speed, but a deviation is permitted when clearly stated in the technical documentation;
- d) “test stroke length” ( $SL_{tst}$ ) in m is the length of the test area plus the cleaning head distance covered by the center of the cleaning head when moving over the appropriate acceleration zones before and after the test area;
- e) “test area” is the surface area to which the artificial dust is applied, with a width that equals the cleaning head width (HW), an appropriate length for carpet or hard floor tests, and other characteristics such as e.g. artificial dust distribution, dust type, surface type and surface preparation as appropriate for either the carpet or the hard floor test;
- f) “cleaning head width” (HW) in m with 3 decimal precision is the external maximum width of the cleaning head;
- g) “cleaning cycle” means the sequence of 5 double strokes of the vacuum cleaner on a floor-specific test area (‘carpet’ or ‘hard floor’) , whereby the dust pick-up is measured after 5 double strokes;



- h) “test area surface covered” ( $A$ ) in  $m^2$  is the surface area covered by the cleaning head when the center of the cleaning head is passing over the test area, calculated as 10 times the product of the head width  $HW$  [m] and the appropriate test area length [m];
- i) “test crevice” is a removable U-shaped insert with appropriate dimensions filled at the beginning of the cleaning cycle with a appropriate artificial dust at an appropriate linear density;
- j) “hard floor test” means a test of 3 cleaning cycles where the cleaning head of a vacuum cleaner operating at maximum suction setting passes over a wooden test plate test area with width equal to the cleaning head width ( $HW$ ) and appropriate length, featuring a diagonally ( $45^\circ$ ) placed test crevice, where the time elapsed [s], electric power consumption [W] and the relative position of the center of the cleaning head to the test area [mm] are continuously measured and recorded at an appropriate sample rate and where at the end of each cleaning cycle the mass decrease of the test crevice [g] is appropriately assessed;
- k) “carpet test” means a test with 3 cleaning cycles on an appropriately calibrated carpet test rig where the cleaning head of a vacuum cleaner operating at maximum suction setting passes over the test area soiled with equally distributed and appropriately embedded test dust at an appropriate average distribution, where the time elapsed [s], electric power consumption [W] and the relative position of the center of the cleaning head to the test area [mm] are continuously measured and recorded at an appropriate sample rate and at the end of each cleaning cycle the mass increase of the appliance dust receptacle [g] is appropriately assessed;
- l) “total test time” ( $t_{tot}$ ) is the time in h with 4 decimal precision during which the cleaning head is moving and battery-operated parts are functioning during the whole test (3 cleaning cycles);
- m) “effective test time” ( $t$ ) is the time in h with 4 decimal precision during which the center of the cleaning head, i.e. a point halfway between the side, front and back edges of the cleaning head, is moving over the test area per cleaning cycle;
- n) “battery energy consumption” ( $E$ ) in Wh is the electricity consumption in Wh at 2 decimal precision of battery-operated parts of the vacuum cleaner to return the battery to its originally fully charged state after a full carpet or hard floor test (3 cleaning cycles);
- o) “equivalent battery power consumption” ( $NP$ ) in W at 2 decimal precision is  $E$  [Wh] divided by  $t_{tot}$  [h];
- p) “specific energy consumption” ( $SE$ ) in Wh/ $m^2$  at 2 decimal precision is the average electricity consumption, excluding electricity consumption in acceleration zones, per square meter of test area surface covered [ $m^2$ ];
- q) “specific energy consumption hard floor test” ( $SE_h$ ) in Wh/ $m^2$  is the average  $SE$  during the three cleaning cycles that constitute the hard floor test;
- r) “specific energy consumption carpet test” ( $SE_c$ ) in Wh/ $m^2$  is the average  $SE$  during the three cleaning cycles that constitute the carpet test;
- s) “average specific energy consumption” ( $SE_a$ ) in Wh/ $m^2$  for vacuum cleaners designed for cleaning both hard floors and carpets is the sum of  $0,5SE_h$  and  $0,5SE_c$ ;
- t) “average effective power intake” ( $P_{eff}$ ) in W at an accuracy of 2 decimal places is the average electric power consumption during a carpet or hard floor test during the time

that the center of the cleaning head is effectively moving over the test area, whereby if this value is lower than  $0.9 P_{rated}$  the value  $P_{eff}$  is assumed to be equal to  $0.9 P_{rated}$ , increased by  $P_{bat}$ ;

- u) “rated input power” ( $P_{rated}$ ) in W is the input electric input power declared by the manufacturer;
- v) “noise power” is airborne acoustical noise emissions, expressed in dB(A) re 1 pW and rounded to the nearest integer;
- w) “annual energy consumption” ( $AE$ ) in kWh/a is the specific energy consumption  $SE$  multiplied by 87 m<sup>2</sup> dwelling surface, 50 annual vacuum cleaning cycles per dwelling, a factor 0.001 for the conversion from Wh to kWh and corrected for the cleaning performance using the reciprocal of the dust pick-up, whereby  $AE$  is defined for carpet ( $AE_c$ ), hard floor ( $AE_{hf}$ ) and general-purpose vacuum cleaners ( $AE_a$ );
- x) “reference vacuum cleaner system” electrically operated laboratory equipment used to measure the reference dust pick-up on carpets with given air related parameters to improve the reproducibility of test results;
- y) “uncorrected carpet dust pick-up” ( $dpu_c$ ) is the measured average dust pick-up of the vacuum cleaner model during the carpet test, not corrected for specific condition of the carpet;
- z) “reference dust pick-up” ( $K_{ref}$ ) is the measured dust pick-up of the reference vacuum cleaner system on the test carpet that is used for the determination of energy efficiency;
- aa) “calibrated dust pick-up” ( $K_c$ ) is the calibrated dust pick-up of the reference vacuum cleaner system used for testing;

#### 4. Equations

##### Annual Energy consumption $AE$

The average annual energy consumption  $AE$  is calculated, in kWh/year and rounded to one decimal place, as follows:

for carpet vacuum cleaners:

$$AE_c = \frac{4 \times 87 \times 50 \times 0.001 \times SE_c}{dpu_c} \quad [1]$$

for hard floor vacuum cleaners:

$$AE_{hf} = \frac{4 \times 87 \times 50 \times 0.001 \times SE_{hf}}{dpu_{hf}} \quad [2]$$

for general-purpose vacuum cleaners:

$$AE_a = 0.5AE_c + 0.5AE_{hf} \quad [3]$$

where

- $SE_c$  is average Specific Energy consumption in Wh/m<sup>2</sup> carpet test area;
- $SE_{hf}$  is average Specific Energy consumption in Wh/m<sup>2</sup> test area in hard floor test;
- $dpu_c$  is dust pick-up in carpet test;
- $dpu_{hf}$  is dust pick-up in hard floor test;
- 50 is the standard number of cleaning tasks per year;
- 87 is the standard dwelling surface to be cleaned in m<sup>2</sup>;
- 4 is the standard number of times that a vacuum cleaner passes over each point in the floor (single strokes);
- 0.001 is the conversion factor from Wh to kWh.

### **Specific Energy Consumption $SE$**

The general equation for the Specific Energy consumption  $SE$  in Wh/m<sup>2</sup> test area, applicable for carpet, hard floor and general purpose vacuum cleaners with the appropriate suffixes, is:

$$SE = \frac{(P + NP) \times t}{A} \quad [4]$$

where

- $P$  is average effective power consumption in  $W$  during a cleaning cycle when the center of the cleaning head is passing over the test area, increased with the average power equivalent of battery-operated parts  $P_{bat}$ ;
- $t$  is the total time in  $h$  per cleaning cycle during which the centre of the cleaning head is passing over the test area;
- $A$  is the surface area in m<sup>2</sup> passed over by the cleaning head over the test area, calculated as 10 times the product of the head width ( $HW$ ) and the appropriate length of test area. If a household vacuum cleaner has a head width of over 32cm, then this figure shall be substituted for head width in this calculation;
- $NP$  is the average power equivalent in  $W$  of battery-operated parts, if any, of the vacuum cleaner, calculated as given in the next section;

For the hard floor tests the suffix  $hf$  and parameter names  $SE_{hf}$ ,  $P_{hf}$ ,  $NP_{hf}$ ,  $t_{hf}$  and  $A_{hf}$  shall be used in the above equation. For the carpet tests the suffix  $c$  and parameter names  $SE_c$ ,  $P_c$ ,  $NP_c$ ,  $t_c$  and  $A_c$  shall be used in the above equation.

Values of  $SE_{hf}$ ,  $P_{hf}$ ,  $NP_{hf}$ ,  $t_{hf}$ ,  $A_{hf}$  and/or  $SE_c$ ,  $P_c$ ,  $NP_c$ ,  $t_c$ ,  $A_c$  shall be included in the technical documentation.

### **Power equivalent of battery operated parts $NP$**

The general equation for the average power equivalent of battery-operated parts  $NP$  in  $W$ , applicable for carpet, hard floor and general purpose vacuum cleaners with the appropriate suffixes, is:

$$NP = \frac{E}{t_{tot}} \quad [5]$$

where

- $E$  in Wh is the electricity consumption in Wh of battery-operated parts of the vacuum cleaner to return the initially fully charged battery to its originally fully charged state after a complete carpet or hard floor test (3 cleaning cycles);
- $t_{tot}$  is the total time in h during which the battery-operated parts of the vacuum cleaner have been activated, in accordance with manufacturer's instructions, during a complete carpet or hard floor test (3 cleaning cycles);

In case the vacuum cleaner is not equipped with battery operated parts the value of NP is zero (0).

For the hard floor tests the suffix hf and parameter names  $NP_{hf}$ ,  $E_{hf}$ ,  $t_{tothf}$  shall be used in the above equation. For the carpet tests the suffix c and parameter names  $NP_c$ ,  $E_c$ ,  $t_{totc}$  shall be used in the above equation.

Values of  $NP_{hf}$ ,  $E_{hf}$ ,  $t_{tothf}$  and/or  $NP_c$ ,  $E_c$ ,  $t_{totc}$  shall be included in the technical documentation.

### **Corrected dust pick-up in carpet test $dpu_c$**

The carpet test shall be performed on Wilton carpet with a reference dust pick-up level of 65%. To correct for deviations from a test carpet's original properties a reference vacuum cleaner system is used to determine the calibrated dust pick up  $K_c$  under calibrated test conditions and to determine the reference dust pick up  $K_{ref}$  for the test carpet that is used for the carpet test of a specific vacuum cleaner model. The corrected dust pick-up value  $dpu_c$  is derived from the measured dust pick-up  $dpu_c^u$  through the equation:

$$dpu_c = dpu_c^u \times (K_{ref} / K_c)$$

Values of  $dpu_c$ ,  $dpu_c^u$ ,  $K_{ref}$  and  $K_c$  shall be included in the technical documentation

## ANNEX III

### Verification procedure for market surveillance purposes

For the purposes of checking conformity with the requirements laid down in Directive 2009/125/EU, the authorities of the Member States shall apply the following verification procedure to check whether a model complies with the Ecodesign requirements in Annex I of this working document and whether the values declared in accordance with Annex I are correct:

(a) Consistency of declared values

1. The authorities of the Member State shall collect declarations provided in accordance with this working document (or provided in accordance with any implementing legislation under Directive 2010/30/EC). The declared ratings for energy efficiency, or dust pick up (on carpet or hard floor) or the value of annual energy consumption shall be considered incorrect if they do not correspond to the corresponding values determined in accordance with Annex II on the basis of declared values for other parameters. The declared value of the average effective power intake shall be considered incorrect if it is less than 90% of the rated input power<sup>6</sup>.
2. However, if on the basis of the calculations contained in the technical documentation, this difference is explained by rounding of declared values in accordance with the requirements of this working document, then this shall not be considered proof that the values are incorrect.
3. If on the basis of declared values, or calculations derived from them, the vacuum cleaner fails to meet the specific Ecodesign requirements of Annex I.1, then it shall be considered to have failed to meet those requirements.

(b) Consistency with Technical Documentation

4. The authorities of the Member State shall examine the technical documentation (Chapter 4, Annex I.2). If a declared value is more favourable to the supplier than the average (rounded in accordance with this working document) of the relevant test results included in the technical documentation, then the declared value shall be considered incorrect.
5. If on the basis of the average of test results included in the technical documentation, the vacuum cleaner fails to meet the specific Ecodesign requirements of Annex I.1, then it shall be considered to have failed to meet those requirements.
6. Where the declared values, or compliance with specific Ecodesign requirements, are based on calculations or extrapolations made on the basis of Chapter 2; the declared value shall be considered incorrect if, on average, the calculated or extrapolated value (before rounding) is more favourable to the supplier than the measured value in tests performed to verify such extrapolations or calculations.
7. Where an error in the calculations or extrapolations made on the basis of Chapter 2, mean that a model appears to comply with the Ecodesign limits in Annex I, while extrapolations or calculations, correctly calibrated to the tests mentioned in 3 above, would imply it did not comply, then it will be considered not to comply.

(c) Testing

8. The authorities of the Member State shall test one single unit.

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9. The declared values of the model shall be considered to be correct and the Ecodesign requirements met, if they all fall within the tolerances set out in table 1.
10. If the result referred to in point two is not achieved, the Member State authorities shall randomly select three additional units of the same model for testing. As an alternative, they may also test three additional units of one or more models which, in accordance with Chapter 4.2, have been listed as equivalent in the manufacturer's technical documentation.
11. The declared values of the model shall be considered to be correct and the Ecodesign requirements met, if they fall within the tolerances set out in table 1.
12. If the result referred to in point 4 is not achieved, then for all equivalent models, the relevant declared values shall be considered to be incorrect, and the relevant Ecodesign requirements shall be considered not to have been met.
13. There is no requirement to carry out tests to measure all declared values, or compliance with all the Ecodesign requirements. If in respect of a declared value, or compliance with an Ecodesign requirement, a model or equivalent models, is considered correct under point 2 above, but incorrect under point 5, then it shall be considered incorrect.

(d) Compliance

14. If under A,B or C above, any of the relevant declared values are incorrect, or the model fails to comply with any of the Ecodesign requirements of Annex I, the model, and all equivalent models, shall be considered not to comply with this working document. The authorities of the Member State shall (within 3 months). provide details of all such cases, and of tests carried out under C.1 and 3 above to the authorities of the other Member States and to the Commission.
15. If the result referred to in point C.2 above is not achieved, this may be considered grounds for administrative action such as requiring the manufacturer to pay the costs of testing under point C.3 above, or publishing the test results.

For the purposes of checking conformity of the declared values with the requirements of this working document, Member State authorities shall use the measurements, calculation methods, technical definitions and equations set out in Annex II.

**Table 1**

Measured parameter	Verification tolerances
Average Annual Energy Consumption	The value calculated on the basis of the relevant measured <sup>(1)</sup> values shall not be greater than the declared value <sup>(2)</sup> or the relevant Ecodesign limit from Annex I by more than 10%.
Average effective power intake	The measured <sup>(1)</sup> value shall not be less than the declared value <sup>(2)</sup> of $P_{\text{eff}}$ by more than 4%.
Head width	The measured <sup>(1)</sup> value shall not be greater than the declared value <sup>(2)</sup> .
Dust pick up on carpet	The measured <sup>(1)</sup> value shall not be less than the declared value <sup>(2)</sup> of $dpu_c$ or the relevant Ecodesign limit from Annex I by more than 3 % of the weight of test dust placed on the

	carpet.
Dust pick up on hard floor with crevice	The measured <sup>(1)</sup> value shall not be less than the declared value <sup>(2)</sup> of $dpu_{hf}$ or the relevant Ecodesign limit from Annex I by more than 3 % of the weight of test dust in the swept part of the crevice.
Dust re-emission	The measured <sup>(1)</sup> value shall not be greater than the declared value <sup>(2)</sup> or the relevant Ecodesign limit from Annex I by more than 15%.
Noise	The measured value should not be greater than the declared value.

<sup>(1)</sup> for point C 4 above the 'measured value' is the arithmetic average of the values measured for each of the 3 further units tested. If the models tested are 'equivalent models' and the declared values are different, then for each unit tested the ratio of the measured value to the declared value shall be calculated, and the verification tolerance shall be applied to the arithmetic average of these ratios.

<sup>(2)</sup> "declared value" means a value that is declared by the manufacturer

## ANNEX IV

### **BENCHMARKS**

At the time of entry into force of this working document, the best available technology on the market for domestic vacuum cleaners, in terms of their specific energy consumption, is an upright vacuum cleaner of 650 W at a cleaning head width of 28 cm, which translates into a specific energy consumption of 1,29 Wh/m<sup>2</sup>, although with noise power level rated at over 83 dB.

Battery-driven professional dry vacuum cleaners with a battery operating time of 60 minutes can be found at a nominal power 400 W, a cleaning head of approx. 30 cm and at a 68 dB noise power level. Their specific energy consumption is around 0,75 Wh/m<sup>2</sup>.

Dust pick-up data for the above machines, compliant with the methods defined and referenced in this working document are not available. Best dust pick-up currently available on the market is around 108% for Hard floor with crevice, and 90% on carpet.