

**COMMISSION REGULATION (EU) No 666/2013****of 8 July 2013****implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to  
ecodesign requirements for vacuum cleaners****(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 products<sup>(1)</sup>, and in particular Article 15(1) thereof,

After consulting the Consultation Forum referred to in Article 18 of Directive 2009/125/EC,

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) 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 Consultation Forum, the Commission has to, as appropriate, introduce implementing measures 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 Union 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 and

outdoor vacuums have particular characteristics and should therefore be exempted from the scope of this Regulation.

- (5) The environmental aspects of the products covered, identified as significant for the purposes of this Regulation, are energy consumption in the use phase, dust pick-up, dust re-emission, noise (sound power level) and durability. The annual electricity consumption of products subject to this Regulation was estimated to have been 18 TWh in the Union 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 Regulation can be significantly reduced.
- (6) The preparatory study shows that requirements regarding further ecodesign parameters referred to in Part 1 of Annex I to Directive 2009/125/EC are not necessary in the case of vacuum cleaners.
- (7) The energy consumption of vacuum cleaners 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 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.
- (10) A review of this Regulation is foreseen no later than 5 years after its entry into force and in relation to two provisions no later than 1 September 2016.

<sup>(1)</sup> OJ L 285, 31.10.2009, p. 10.

- (11) Commission Regulation (EU) No 327/2011 of 30 March 2011 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to Ecodesign requirements for fans driven by motors with an electric input power between 125 W and 500 kW <sup>(1)</sup> should be amended to exclude fans integrated in vacuum cleaners from its scope in order to prevent specific ecodesign requirements for the same products to be contained in two separate regulations.
- (12) 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 organisations, as listed in Annex I to Regulation (EU) No 1025/2012 of the European Parliament and of the Council of 25 October 2012 on European standardisation <sup>(2)</sup>.
- (13) In accordance with Article 8 of Directive 2009/125/EC, this Regulation should specify the applicable conformity assessment procedures.
- (14) In order to facilitate compliance checks, manufacturers should provide information contained in the technical documentation referred to in Annexes IV and V of Directive 2009/125/EC insofar as this information relates to the requirements laid down in this Regulation.
- (15) 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.
- (16) 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:

#### Article 1

##### Subject matter and scope

1. This Regulation establishes eco-design requirements for the placing on the market of electric mains-operated vacuum cleaners, including hybrid vacuum cleaners.
2. This Regulation shall not apply to:
  - (a) wet, wet and dry, battery operated, robot, industrial, or central vacuum cleaners;

<sup>(1)</sup> OJ L 90, 6.4.2011, p. 8.

<sup>(2)</sup> OJ L 316, 14.11.2012, p. 12.

- (b) floor polishers;
- (c) outdoor vacuums.

#### Article 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 Regulation:

- (1) 'vacuum cleaner' means an appliance that removes soil from a surface to be cleaned by means of an airflow created by underpressure developed within the unit;
- (2) 'hybrid vacuum cleaner' means a vacuum cleaner that can be powered by both electric mains and batteries;
- (3) 'wet vacuum cleaner' means a vacuum cleaner 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 it, and the soil by an airflow created by underpressure developed within the unit, including types commonly known as spray-extraction vacuum cleaners;
- (4) 'wet and dry vacuum cleaner' means a vacuum cleaner designed to remove a volume of more than 2,5 litres, of liquid, in combination with the functionality of a dry vacuum cleaner;
- (5) 'dry vacuum cleaner' means a vacuum cleaner designed to remove soil that is principally dry (dust, fibre, threads), including types equipped with a battery operated active nozzle;
- (6) 'battery operated active nozzle' means a cleaning head provided with an agitation device powered by batteries to assist dirt removal;
- (7) 'battery operated vacuum cleaner' means a vacuum cleaner powered only by batteries;
- (8) '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;
- (9) 'industrial vacuum cleaner' means a vacuum cleaner designed to be part of a production process, designed for removing hazardous material, designed for removing heavy dust from building, foundry, mining or food industry, part of an industrial machine or tool and/or a commercial vacuum cleaner with a head width exceeding 0,50 m;

- (10) '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 pertaining to the Directive 2006/42/EC of the European Parliament and of the Council <sup>(1)</sup>;
- (11) 'central vacuum cleaner' means a vacuum cleaner with a fixed (not movable) underpressure source location and the hose connections located at fixed positions in the building;
- (12) '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;
- (13) 'outdoor vacuum' means an appliance that is designed for use outdoors to collect debris such as grass clippings and leaves into a collector by means of an airflow created by underpressure developed within the unit and which may contain a shredding device and may also be able to perform as a blower;
- (14) 'full size battery operated vacuum cleaner' means a battery operated vacuum cleaner which when fully charged, can clean 15 m<sup>2</sup> of floor area by applying 2 double strokes to each part of the floor without recharge;
- (15) 'water filter vacuum cleaner' means a dry vacuum cleaner that uses more than 0,5 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;
- (16) 'household vacuum cleaner' means a vacuum cleaner intended for household or domestic use, declared by the manufacturer as such in the Declaration of Conformity pertaining to Directive 2006/95/EC of the European Parliament and of the Council <sup>(2)</sup>;
- (17) 'general purpose vacuum cleaner' means a vacuum cleaner supplied with a fixed or at least one detachable nozzle designed for cleaning both carpets and hard floors, or supplied with both at least one detachable nozzle designed specifically for cleaning carpets and at least one detachable nozzle for cleaning hard floors;
- (18) 'hard floor vacuum cleaner' means a vacuum cleaner supplied with a fixed nozzle designed specifically for cleaning hard floors, or supplied solely with one or more detachable nozzles designed specifically for cleaning hard floors;
- (19) 'carpet vacuum cleaner' means a vacuum cleaner supplied with a fixed nozzle designed specifically for cleaning carpets, or supplied solely with one or more detachable nozzles designed specifically for cleaning carpets;
- (20) 'equivalent vacuum cleaner' means a model of vacuum cleaner placed on the market with the same input power, annual energy consumption, dust pick up on carpet and hard floor, dust re-emission, sound power level, hose durability and operational motor lifetime as another model of vacuum cleaner placed on the market under a different commercial code number by the same manufacturer.

### Article 3

#### Ecodesign requirements

1. The ecodesign requirements for vacuum cleaners are set out in Annex I. They shall apply in accordance with the following timetable:

- (a) from 1 September 2014: as indicated in Annex I, point 1(a) and point 2;
- (b) from 1 September 2017: as indicated in Annex I, point 1(b) and point 2.

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

### Article 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 calculations set out in Annex II to this Regulation.

3. Where the information included in the technical documentation for a particular vacuum cleaner model has been obtained by calculation on the basis of an equivalent vacuum cleaner, the technical documentation shall include details of such calculations 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.

<sup>(1)</sup> OJ L 157, 9.6.2006, p. 24.

<sup>(2)</sup> OJ L 374, 27.12.2006, p. 10.

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

Member States shall apply the verification procedure described in Annex III to this Regulation 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.

*Article 6***Indicative benchmarks**

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

*Article 7***Revision**

1. The Commission shall review this Regulation in the light of technological progress and present the result of that review to the Consultation Forum no later than five years after its entry into force. The review shall in particular assess the verification tolerances set out in Annex III, whether full size battery operated vacuum cleaners should be included in the scope and whether it is feasible to set annual energy consumption,

dust pick-up and dust re-emission requirements that are based on measurement with a partly loaded rather than an empty receptacle.

2. The Commission shall review the specific ecodesign requirements on the durability of the hose and the operational motor lifetime and present the result of that review to the Consultation Forum no later than 1 September 2016.

*Article 8***Amendment to Regulation (EU) No 327/2011**

Regulation (EU) No 327/2011 is amended as follows:

The following is added in the end of Article 1(3):

‘(e) designed to operate with an optimum energy efficiency at 8 000 rotations per minute or more.’

The following is deleted in Article 3(4):

‘(a) with an optimum energy efficiency at 8 000 rotations per minute or more.’

*Article 9***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, 8 July 2013.

*For the Commission*  
*The President*  
José Manuel BARROSO

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## ANNEX I

**Ecodesign requirements****1. Specific Ecodesign requirements**

Vacuum cleaners shall comply with the following requirements:

(a) From 1 September 2014:

- annual energy consumption shall be less than 62,0 kWh/year,
- rated input power shall be less than 1 600 W,
- dust pick up on carpet ( $dpu_c$ ) shall be greater than or equal to 0,70. This limit shall not apply to hard floor vacuum cleaners,
- dust pick up on hard floor ( $dpu_{hf}$ ) shall be greater than or equal to 0,95. This limit shall not apply to carpet vacuum cleaners.

These limits shall not apply to water filter vacuum cleaners.

(b) From 1 September 2017:

- annual energy consumption shall be less than 43,0 kWh/year,
- rated input power shall be less than 900W,
- dust pick up on carpet ( $dpu_c$ ) shall be greater than or equal to 0,75. This limit shall not apply to hard floor vacuum cleaners,
- dust pick up on hard floor ( $dpu_{hf}$ ) shall be greater than or equal to 0,98. This limit shall not apply to carpet vacuum cleaners,
- dust re-emission shall be no more than 1,00 %,
- sound power level shall be less than or equal to 80 dB(A),
- the hose, if any, shall be durable so that it is still useable after 40 000 oscillations under strain,
- operational motor lifetime shall be greater than or equal to 500 hours.

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, sound power level, durability of the hose and operational motor lifetime are measured and calculated in accordance with Annex II.

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

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

- any information required to be published in respect of the vacuum cleaner under any delegated acts adopted under Directive 2010/30/EU of the European Parliament and of the Council <sup>(1)</sup>,
- short title or reference to the measurement and calculation methods used to establish compliance with the above requirements,
- for hard floor vacuum cleaners, mention that they are not suitable for use on carpets with the delivered nozzle,
- for carpet vacuum cleaners, mention that they are not suitable for use on hard floors with the delivered nozzle,
- for appliances that are enabled to function also for other purposes than vacuum cleaning, the electric input power relevant to vacuum cleaning if this is lower than the rated input power of the appliance,
- as which of the following three groups the vacuum cleaner should be tested: general purpose vacuum cleaner, hard floor vacuum cleaner or carpet vacuum cleaner.

<sup>(1)</sup> OJ L 153, 18.6.2010, p. 1.

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- (b) The technical documentation and a part for professionals of the free access websites of manufacturers, their authorised representatives, or importers shall contain the following elements:
- information relevant for non-destructive disassembly for maintenance purposes, in particular in relation to the hose, suction inlet, motor, casing and cable,
  - information relevant for dismantling, in particular in relation to the motor and any batteries, recycling, recovery and disposal at end-of-life.
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## ANNEX II

**Measurement and calculation methods**

1. 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 methods that take into account the generally recognised state-of-the-art measurement and calculation methods, including harmonised standards the reference numbers of which have been published for the purpose in the *Official Journal of the European Union*. They shall meet the technical definitions, conditions, equations and parameters set out in this Annex.

**2. Technical definitions**

- (a) 'hard floor test' means a test of two 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 and appropriate length, featuring a diagonally (45°) placed test crevice, where the time elapsed, electric power consumption and the relative position of the centre of the cleaning head to the test area 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 is appropriately assessed;
- (b) 'test crevice' means a removable U-shaped insert with appropriate dimensions filled at the beginning of a cleaning cycle with appropriate artificial dust;
- (c) 'carpet test' means a test with an appropriate number of cleaning cycles on a Wilton carpet test rig where the cleaning head of a vacuum cleaner operating at maximum suction setting passes over the test area with width equal to the cleaning head width and appropriate length, soiled with equally distributed and appropriately embedded test dust of appropriate composition, where the time elapsed, electric power consumption and the relative position of the centre of the cleaning head to the test area 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 is appropriately assessed;
- (d) 'cleaning head width' in m, at an accuracy of 3 decimal places, means the external maximum width of the cleaning head;
- (e) 'cleaning cycle' means a sequence of 5 double strokes of the vacuum cleaner on a floor-specific test area ('carpet' or 'hard floor');
- (f) 'double stroke' means 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;
- (g) 'test stroke speed' in m/h means 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;
- (h) 'test stroke length' in m means the length of the test area plus the cleaning head distance covered by the centre of the cleaning head when moving over the appropriate acceleration zones before and after the test area;
- (i) 'dust pick up' (*dpu*), at an accuracy of 3 decimal places, means the ratio of the mass of the artificial dust removed, determined for carpet through the mass increase of the appliance dust receptacle and for hard floor through the mass decrease of the test crevice, after a number of double strokes of the cleaning head to the mass of artificial dust initially applied to a test area, for carpet corrected for the specific test conditions and for hard floor corrected for the length and positioning of the test crevice;
- (j) 'reference vacuum cleaner system' means electrically operated laboratory equipment used to measure the calibrated and reference dust pick-up on carpets with given air related parameters to improve the reproducibility of test results;
- (k) 'rated input power' in W means the electric input power declared by the manufacturer, whereby for appliances that are enabled to function also for other purposes than vacuum cleaning only the electric input power relevant to vacuum cleaning applies;
- (l) 'dust re-emission' means the ratio, expressed as a percentage at an accuracy of 2 decimal places, of the number of all dust particles of a size from 0,3 to 10 µm emitted by a vacuum cleaner to the number of all dust particles of the same size range entering the suction inlet when fed with a specific amount of dust of that particle size range. 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;
- (m) 'sound power level' means airborne acoustical noise emissions, expressed in dB(A) re 1 pW and rounded to the nearest integer.

### 3. Annual energy consumption

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

for carpet vacuum cleaners:

$$AE_c = 4 \times 87 \times 50 \times 0,001 \times ASE_c \times \left( \frac{1 - 0,20}{dpu_c - 0,20} \right)$$

for hard floor vacuum cleaners:

$$AE_{hf} = 4 \times 87 \times 50 \times 0,001 \times ASE_{hf} \times \left( \frac{1 - 0,20}{dpu_{hf} - 0,20} \right)$$

for general-purpose vacuum cleaners:

$$AE_{gp} = 0,5 \times AE_c + 0,5 \times AE_{hf}$$

where:

- $ASE_c$  is the average specific energy consumption in Wh/m<sup>2</sup> during carpet test, calculated as provided below
- $ASE_{hf}$  is the average specific energy consumption in Wh/m<sup>2</sup> during hard floor test, calculated as provided below
- $dpu_c$  is the dust pick-up on carpet, determined in accordance with point 4 of this Annex
- $dpu_{hf}$  is the dust pick-up on hard floor, determined in accordance with point 4 of this Annex
- 50 is the standard number of one-hour 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 on the floor (two double strokes)
- 0,001 is the conversion factor from Wh to kWh
- 1 is the standard dust pick-up
- 0,20 is the standard difference between dust pick-up after five and after two double strokes.

#### Average specific energy consumption (ASE)

The average specific energy consumption during carpet test ( $ASE_c$ ) and during hard floor test ( $ASE_{hf}$ ) shall be determined as an average of the specific energy consumption ( $SE$ ) of the number of cleaning cycles that constitute the carpet and hard floor test, respectively. The general equation for the specific energy consumption  $SE$  in Wh/m<sup>2</sup> test area, at an accuracy of 3 decimal places, applicable for carpet, hard floor and general purpose vacuum cleaners with the appropriate suffixes, is:

$$SE = \frac{(P + NP) \times t}{A}$$

where:

- $P$  is the average power in W, at an accuracy of 2 decimal places, during the time in a cleaning cycle that the centre of the cleaning head is moving over the test area
- $NP$  is the average power equivalent in W, at an accuracy of 2 decimal places, of battery operated active nozzles, if any, of the vacuum cleaner, calculated as provided below
- $t$  is the total time in hours, at an accuracy of 4 decimal places, in a cleaning cycle during which the centre 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
- $A$  is the surface area in m<sup>2</sup>, at an accuracy of 3 decimal places, passed over by the cleaning head in a cleaning cycle, calculated as 10 times the product of the head width and the appropriate length of test area. If a household vacuum cleaner has a head width of over 0,320 m, then the figure of 0,320 m shall be substituted for head width in this calculation.

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. For each of the cleaning cycles, values of  $SE_{hf}$ ,  $P_{hf}$ ,  $NP_{hf}$ ,  $t_{hf}$ ,  $A_{hf}$  and/or  $SE_c$ ,  $P_c$ ,  $NP_c$ ,  $t_c$ ,  $A_c$ , as applicable, shall be included in the technical documentation.



Power equivalent of battery operated active nozzles (NP)

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

$$NP = \frac{E}{t_{bat}}$$

where:

- E is the electricity consumption in Wh at an accuracy of 3 decimal places of the battery operated active nozzle of the vacuum cleaner necessary to return the initially fully charged battery to its originally fully charged state after a cleaning cycle;
- $t_{bat}$  is the total time in hours, at an accuracy of 4 decimal places, in a cleaning cycle in which the battery operated active nozzle of the vacuum cleaner is activated, in accordance with manufacturer's instructions;

In case the vacuum cleaner is not equipped with battery operated active nozzles the value of NP equals zero.

For the hard floor tests the suffix *hf* and parameter names  $NP_{hf}$ ,  $E_{hf}$ ,  $t_{bat_{hf}}$  shall be used in the above equation. For the carpet tests the suffix *c* and parameter names  $NP_c$ ,  $E_c$ ,  $t_{bat_c}$  shall be used in the above equation. For each of the cleaning cycles, values of  $E_{hf}$ ,  $t_{bat_{hf}}$  and/or  $E_c$ ,  $t_{bat_c}$ , as applicable, shall be included in the technical documentation.

#### 4. Dust pick-up

The dust pick-up on hard floor ( $dpu_{hf}$ ) shall be determined as the average of the results of the two cleaning cycles in a hard floor test.

The dust pick-up on carpet ( $dpu_c$ ) shall be determined as the average of the results of the cleaning cycles in a carpet test. To correct for deviations from a test carpet's original properties, the dust pick-up on carpet ( $dpu_c$ ) shall be calculated as follows:

$$dpu_c = dpu_m \times \left( \frac{dpu_{cal}}{dpu_{ref}} \right)$$

where:

- $dpu_m$  is the measured dust pick-up of the vacuum cleaner;
- $dpu_{cal}$  is the dust pick-up of the reference vacuum cleaner system measured when the test carpet was in original condition;
- $dpu_{ref}$  is the measured dust pick-up of the reference vacuum cleaner system.

Values of  $dpu_m$  for each of the cleaning cycles,  $dpu_c$ ,  $dpu_{cal}$  and  $dpu_{ref}$  shall be included in the technical documentation.

#### 5. Dust re-emission

The dust re-emission shall be determined while the vacuum cleaner is operating at its maximum air flow.

#### 6. Sound power level

Sound power level shall be determined on carpet.

#### 7. Durability of the hose

The hose shall be considered useable after 40 000 oscillations under strain if it is not visibly damaged after those oscillations. Strain shall be applied by means of a weight of 2,5 kilogram.

#### 8. Operational motor life-time

The vacuum cleaner shall run with a half-loaded dust receptacle intermittently with periods of 14 minutes and 30 seconds on and 30 seconds off. Dust receptacle and filters shall be replaced at appropriate time intervals. The test may be discontinued after 500 hours and shall be discontinued after 600 hours. The total run-time shall be recorded and included in the technical documentation. Air flow, vacuum and input power shall be determined at appropriate intervals and values shall, along with the operational motor lifetime, be included in the technical documentation.

#### 9. Hybrid vacuum cleaners

For hybrid vacuum cleaners all measurements shall be executed with the vacuum cleaner powered by the electric mains and any battery operated active nozzle only.

## ANNEX III

**Verification procedure for market surveillance purposes**

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

1. The Member State authorities shall test one single unit per model.
2. The vacuum cleaner model shall be considered to comply with the applicable requirements set out in Annex I to this Regulation if the values in the technical documentation comply with the requirements set out in that Annex and if testing of the relevant model parameters listed in Annex I and Table 1 shows compliance for all of those parameters.
3. If the result referred to in point 2 is not achieved, the Member State authorities shall randomly select three additional units of the same model for testing. As an alternative, the three additional units selected may be of one or more different models which, in accordance with Article 4, have been listed as equivalent vacuum cleaner in the manufacturer's technical documentation.
4. The vacuum cleaner model shall be considered to comply with the applicable requirements set out in Annex I to this Regulation if testing of the relevant model parameters listed in Annex I and Table 1 shows compliance for all of those parameters.
5. If the results referred to in point 4 are not achieved, the model and all equivalent vacuum cleaner models shall be considered not to comply with this Regulation.

Member State authorities shall use the measurement and calculation methods set out in Annex II.

The verification tolerances defined in this Annex relate only to the verification of the measured parameters by Member State authorities and shall not be used by the manufacturer or importer as an allowed tolerance to establish the values in the technical documentation.

Table 1

Parameter	Verification tolerances
Annual energy consumption	The determined value <sup>(1)</sup> is not more than 10 % higher than the declared value.
Dust pick up on carpet	The determined value <sup>(1)</sup> is not more than 0,03 lower than the declared value.
Dust pick up on hard floor	The determined value <sup>(1)</sup> is not more than 0,03 lower than the declared value.
Dust re-emission	The determined value <sup>(1)</sup> is not more than 15 % higher than the declared value.
Sound power level	The determined value <sup>(1)</sup> is not higher than the declared value.
Operational motor lifetime	The determined value <sup>(1)</sup> is not more than 5 % lower than the declared value.

<sup>(1)</sup> The arithmetic average of the values determined in the case of three additional units tested as prescribed in point 3.

## ANNEX IV

**Benchmarks**

At the time of entry into force of this Regulation, 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 0,28 m, which translates into a specific energy consumption of 1,29 Wh/m<sup>2</sup>, although with sound power level rated at over 83 dB.

Dust pick-up and dust re-emission data for the above machine, compliant with the methods defined and referenced in this Regulation are not available. Best dust pick-up currently available on the market is around 1,08 for hard floor with crevice, and 0,90 on carpet. Best dust re-emission currently available on the market is around 0,0002 %. Best sound power level is 62 dB.

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