

Commission working document on the

COMMISSION DELEGATED REGULATION

**Implementing Directive 2010/30/EU of the European Parliament and of the Council
with regard to energy labelling of vacuum cleaners**

EXPLANATORY MEMORANDUM

- 1. CONTEXT OF THE PROPOSAL**
- 2. CONSULTATION OF INTERESTED PARTIES AND IMPACT ASSESSMENT**
- 3. LEGAL ELEMENTS OF THE PROPOSAL**

4. CONTEXT OF THE PROPOSAL

Grounds for and objectives of the proposal

The environmental impact of vacuum cleaners in the EU is significant, in particular the electricity consumption in the use phase, which was estimated to be 18 TWh per year in 2005, corresponding to 6,6 Mt CO₂ equivalent. Including production of the appliance and consumables the total impact of greenhouse gas emissions is 9-10 Mt CO₂ equivalent.

In order to enable consumers to buy more energy-efficient vacuum cleaners, a labelling scheme is to be put in place with regard to energy labelling of domestic vacuum cleaners. The scheme should provide standardised information on both energy consumption and cleaning performance, as well as on dust-retention and noise power..

This Working document complements draft Commission Regulation implementing Directive 2009/125/EC¹ of the European Parliament and of the Council with regard to Ecodesign requirements for vacuum cleaners.

General context

A main reason for the persistent sales of low efficiency, high-power vacuum cleaners is that end-users perceive that high rated power consumption is linked to higher cleaning performance. This leads them to choose cleaners with high power consumption and so low efficiency.

As a result, the power consumption of vacuum cleaners has risen steadily over the past decades. On average in 2005 the power consumption is estimated to be around 1500 W and in some countries like Germany it is believed to be closer to 2300-2400 W. At the current pace, the EU average in 2020 will be very close to the current German average.

Without many people realizing it, the average electricity consumption of the domestic vacuum cleaners has grown from around. 60 kWh/year in 1990 to a forecast 120 kWh/year in 2020 . At these values vacuum cleaners' energy costs and impact compare with washing machines and dishwashers. Non-domestic ('professional') vacuum cleaners are much less power hungry (30% less power with better performance) and the increase in power consumption has been much less.

The main market failure is the perceived link between rated electric power and cleaning performance, which stands in the way of domestic consumers buying more energy efficient appliances.

Stakeholders, including the industry and consumer organisations, have asked unanimously for a combined introduction of Ecodesign requirements and a labelling scheme for vacuum cleaners.

According to the impact assessment, the total stock of vacuum cleaners of 288 million units was responsible an annual electricity consumption of 18 TWh in 2005 in the EU-27. Without further action this would increase to 34 TWh in 2020. The increase is mainly due to continuing rise in population, dwelling size and (above all) the increase in power consumption. The aim of the proposal is to reverse the expected increase in energy consumption of these appliances. It is estimated that the

¹ OJ L 285, 31.10.2009, p.10-35

combined effect of the new Ecodesign requirements set out in draft Commission Regulation implementing Directive 2009/125/EC and the labelling scheme set out in this draft Working document would lead to a reduction of 19 TWh in 2020.

Existing provisions in the area of the proposal

The draft Commission Regulation implementing Directive 2009/125/EC addresses the environmental performance of vacuum cleaners, but no other mandatory measures or voluntary initiatives exist for vacuum cleaners.

Generic legislation, with relevance for vacuum cleaners, includes:

- Directive 2002/96/EC² of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE);
- Directive 2011/65/EU³ of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment;
- Directive 2006/95/EC⁴ 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 (codified version) (Text with EEA relevance);
- Directive 2006/42/EC⁵ 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);
- Directive 2004/108/EC⁶ of the European Parliament and of the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC Text with EEA relevance.

Consistency with the other policies and objectives of the Union

Increased market take-up of energy-efficient vacuum cleaners, through the introduction of energy and cleaning performance classes as well as Ecodesign requirements, will contribute to achieving the 20% energy savings potential anticipated by 2020 and beyond in the Energy Efficiency Plan 2011 (COM(2006) 545).

Furthermore, implementation of Directive 2010/30/EC⁷ contributes to the EU's objective to attain a reduction in greenhouse gases of at least 20% in 2020.

Promotion of market take-up of efficient vacuum cleaners complies with the Lisbon and renewed Sustainable Development Strategy as it will encourage investment in R&D and make for a level playing field. It is also in line with the Sustainable Consumption, Production and Industrial Policy Action Plan (COM(2008) 397).

The European Economic Recovery Plan (COM(2008) 800) mentions energy efficiency as one of the key priorities, in particular the promotion of the rapid take-up of products offering a 'high potential for energy savings', such as vacuum cleaners.

² OJ L 37, 13.2.2003, p.24.

³ OJ L 174, 1.7.2011, p. 88–110

⁴ OJ L 374, 27.12.2006, p. 10–19

⁵ OJ L 157, 9.6.2006, p. 24–86

⁶ OJ L 390, 31.12.2004, p. 24–37

⁷ OJ L 153, 18.6.2010, p.1.

Finally, it will contribute to the objective of decoupling economic growth from the use of resources set out in the Europe 2020 strategy (COM(2010) 2020) under the 'Resource-efficient Europe' flagship initiative.

5. CONSULTATION OF INTERESTED PARTIES AND IMPACT ASSESSMENT

Consultation of interested parties

Consultation methods, main sectors targeted and general profile of respondents

International and EU stakeholders and Member State experts were consulted from the very beginning of the preparatory study, and, together with Ecodesign requirements, energy labelling was discussed in the "Ecodesign Consultation Forum", which is established by the Ecodesign Framework Directive 2009/125/EC⁸. The Consultation Forum is composed of the experts of the Member States and a balanced representation of stakeholders, namely environmental and consumer NGOs, retailers and manufacturers. During the meetings of the Consultation Forum of June 2010 and of September 2010 the Commission staff presented a working document suggesting Ecodesign requirements and an energy efficiency ranking for vacuum cleaners.

All relevant working documents were circulated to the experts and stakeholders, and published in the Commission's CIRCA system alongside the stakeholder comments received in writing. In addition, the initiative was discussed on many occasions at meetings of Commission staff with stakeholders and Member States, but also with international partners. The draft Working document was notified to the WTO/TBT, to ensure that no barrier to trade is introduced.

Summary of responses and how they have been taken into account

In general an energy labelling scheme for vacuum cleaners pursuant to the recast Energy labelling Directive is well supported by stakeholders and Member States. Following responses on main aspects of the proposal were received:

Product scope and classification

The appliances to be covered are domestic and non-domestic dry vacuum cleaners. Wet, wet & dry, industrial, central and robot-types as well as floor polishers are excluded, because performance standards are not in place and their environmental impact is relatively small compared to the impact of dry vacuum cleaners.

Energy labelling scales

In line with stakeholder proposals the energy labelling metric is in 'annual energy consumption' (in kWh/yr), which in turn depends both on the power consumption (in W) of the vacuum cleaner and the weighted, normalised cleaning performance (in dust pick-up, dpu) for carpets (weighted at 50%, normalised to a dpu of 65%) and hard floors with a crevice (weighted at 50%, normalised to a dpu of 90%).

Timing

Manufacturers and retailers emphasised that, due to the new energy efficiency calculation and measurement method, time is needed to (re)test all vacuum cleaners and produce the necessary information. The draft Working document therefore integrates this time constraint.

⁸ OJ L 285,31.10.2009, p. 10.

Other information requirements

Dust re-emission, the fraction (in %) of small particulate (0.4-10 µ) dust (re)emitted by the vacuum cleaner as a percentage of the number of small dust particles picked-up at its inlet during standard test conditions, was identified by stakeholders as an important parameter especially for users with respiratory problems. Another relevant parameter, and an important selling feature for certain market segments, is the noise power (in dBA re1). However, several stakeholders, especially Member States, recognised the importance of noise power but did not propose to incorporate it in any way in the energy labelling metric because strict noise requirements are detrimental to energy efficiency and/or cleaning performance.

Collection and use of expertise

Input from scientific expertise

A preparatory study and an impact assessment provided the relevant technical, market and economic analysis needed for setting up a revised energy labelling scheme. They were carried out by consortiums of external consultants on behalf of the Commission's Directorate General for Energy (DG ENER).

Main organisations/experts consulted

The preparatory study was conducted in an open process that took into account input from relevant stakeholders including manufacturers and manufacturing associations, environmental NGOs, consumer and retail organizations, EU/EEA Member State experts and international organizations such as the International Energy Agency (IEA). The draft measure was notified to the WTO within the TBT agreement.

Summary of advice received and used

No potentially serious risks with irreversible consequences were mentioned.

Impact assessment

Labelling has to be considered together with other policy options such as self-regulation or the setting of minimum performance (energy efficiency) requirements. An impact assessment was carried out pursuant to Article 15(4)(b) of Directive 2005/32/EC which also examined the option of labelling. The options listed below were discarded at an early stage:

- No EU action (legislation currently in place would not be amended, no new legislation would be adopted). This option was discarded since this option would not meet the objectives laid down in the Ecodesign and Energy Labelling Directives Framework Directives;
- Support a voluntary commitment by the relevant industry. This option was discarded as no such proposals were made by the industry;
- Adopt Ecodesign requirements only. This option was discarded because introducing strict Ecodesign requirements without a proper explanation to the consumer on how it could affect the cleaning performance could be highly disruptive in the market place and would pose a barrier to consumer acceptance to the measure. If such an explanation would be lacking also the ambition level of the measure should probably be less ambitious;
- Adopt labelling scheme only (without Ecodesign requirements). This option

was discarded as it would not achieve the expected savings.

Consequently, the option composed of the adoption of Ecodesign requirements together with a labelling scheme was chosen, as it delivers most savings and is also preferred by all stakeholders.

It will ensure that:

- On-going energy improvements are maintained and fostered;
- Fair competition and product differentiation continues to operate on energy improvements;
- The cost-effective level of energy consumption is reached;
- The competitiveness of the industry is supported through the expansion of the EU internal market for sustainable products;
- The burdens on suppliers including SMEs are not excessive, as the transition periods take redesign cycles into account;
- There is no negative impact on employment in the EU.

6. LEGAL ELEMENTS OF THE PROPOSAL

Summary of the proposed action

The measure sets out new mandatory information requirements for suppliers placing vacuum cleaners on the market, and for dealers offering these appliances at the point of sale or by distant selling such as via catalogues or the internet. The scope of the measure is aligned with the scope of the draft Commission Regulation implementing Directive 2009/125/EC, which sets minimum requirements on annual energy consumption, maximum power consumption, minimum cleaning performance, maximum noise power and maximum dust-retention for vacuum cleaners.

Measurement methods and the verification procedure for market surveillance purposes are fully aligned with the draft Commission Regulation implementing Directive 2009/125/EC.

Legal basis

The draft Working document implements Directive 2010/30/EU, and in particular Article 10 thereof. It is based on Article 194 TFEU.

Subsidiarity principle

The draft Working document implements Directive 2010/30/EU in line with Article 10.

Proportionality principle

In accordance with the principle of proportionality, this measure does not go beyond what is necessary in order to achieve the objective.

The form of the implementing measure is a Working document which is directly applicable in all Member States. This ensures that national and EU administrations will not incur any costs for transposition of the implementing legislation into national legislation.

In terms of conformity assessment, there are no extra costs with respect to the current situation, where energy labelling is already mandatory. The extra cost on the application of the new seasonal efficiency measurement standard on vacuum cleaners other than single and double duct units is requested by manufacturers and estimated to have an insignificant impact on product price.

Choice of instrument

Proposed instrument: Working document.

BUDGETARY IMPLICATION

The proposal has no implication for the EU budget.

ADDITIONAL INFORMATION

None.

Review/revision/sunset clause

The draft includes a revision clause.

European Economic Area

The proposed act concerns an EEA matter and should therefore extend to the European Economic Area.

COMMISSION DELEGATED REGULATION

**Implementing Directive 2010/30/EU of the European Parliament and of the Council
with regard to energy labelling of vacuum cleaners**

THE EUROPEAN COMMISSION,

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

Having regard to Directive 2010/30/EU of the European Parliament and of the Council on the indication by labelling and standard product information of the consumption of energy and other resources by energy related products⁹, and in particular Article 11 thereof,

Whereas:

- (1) Directive 2010/30/EU requires the Commission to adopt delegated acts for the labelling of energy related products representing significant potential for energy savings and presenting a wide disparity in performance levels with equivalent functionality.
- (2) The energy used by vacuum cleaners accounts for a significant part of total energy demand in the Union. The scope for further reducing the energy consumption of vacuum cleaners is substantial.
- (3) Wet, wet and dry, robot, industrial, and central vacuum cleaners and floor polishers particular characteristics and should therefore be exempted from the scope of this Regulation.
- (4) The information provided on the label should be obtained through reliable, accurate and reproducible measurement procedures, 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.
- (5) This Working document should specify a uniform design and content for the label for vacuum cleaners.
- (6) In due course certain energy efficiency classes will be empty because measures taken under Directive 2009/125/EU¹⁰ on Ecodesign requirements ban the placing on the market of such products. In order to make this clear to consumers, such classes shall be given a grey colouring.
- (7) In addition, this Working document should specify requirements as to the technical documentation and the fiche for vacuum cleaners.
- (8) Moreover, this Working document should specify requirements as to the information to be provided for any form of distance selling, advertisements and technical promotional materials of vacuum cleaners.

⁹ OJ L 153, 18.6.2010, p. 1-12.

¹⁰ OJ L 285, 31.10.2009, p. 10-35.

- (9) It is appropriate to provide for a review of the provisions of this Working document taking into account technological progress.

HAS ADOPTED THIS WORKING DOCUMENT:

Chapter 1
Subject matter and scope

1. This Regulation establishes requirements for the labelling and the provision of supplementary product information for electric mains-operated and 'full size' battery operated vacuum cleaners.
2. This Regulation shall not apply to
 - wet, wet and dry, 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 Regulation:

1. “vacuum cleaner” means an appliance that removes soil from the surface to be cleaned by 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;
2. “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;
3. “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;
4. “wet vacuum cleaner” means an electrically operated appliance that removes dry and/or wet material (soil) from the surface by use of water-based detergent or steam to be cleaned 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, including but not limited to types commonly known as spray-extraction vacuum cleaners, scrubber-driers and sweeping machines;
5. “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;
6. “water filter vacuum cleaner” means a 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;
7. “battery operated vacuum cleaner” means a vacuum cleaner powered only by batteries;
8. “hybrid vacuum cleaners” means a vacuum cleaner that can be fully powered by the electric mains, batteries or both electric mains and batteries;

9. “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;
10. “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;
11. “household vacuum cleaner” means a vacuum cleaner intended for household or domestic use, declared by the manufacturer as such in its Declaration of Conformity (DoC) pertaining to the Low Voltage Directive (LVD);
12. “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 its Declaration of Conformity (DoC) pertaining to the Machinery Directive (MD);
13. “industrial vacuum cleaner”: means a mobile or stationary vacuum cleaner designed to be part of a production process. For the purpose of this regulation vacuum cleaners designed
 - for hazardous material,
 - as part of an industrial machine or tool and/or
 - with a head width exceeding 50 cmshall also be considered “industrial vacuum cleaners”;
14. “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;
15. “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;
16. “general purpose vacuum cleaner” means a vacuum cleaner suitable for cleaning both carpets and hard floors;
17. “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);
18. “equivalent vacuum cleaner” means a model of vacuum cleaner placed on the market with the same input power, technical and performance characteristics, energy consumption and airborne acoustical noise as another model of vacuum cleaner placed on the market under a different commercial code number by the same manufacturer;
19. “battery operated active nozzle” means a cleaning head provided with an agitation device powered by batteries to assist dirt removal;

20. "full size battery operated vacuum cleaner" is a battery operated vacuum cleaner designed for general cleaning, which
- when fully charged, can clean 15 m² of floor area with 2 double strokes without recharge, and
 - is able to be tested in the same manner as electric mains operated vacuum cleaners.

Chapter 3

Responsibilities of suppliers

1. Suppliers shall ensure that:
 - (a) each vacuum cleaner is supplied with a printed label in the format and containing the information set out in Annex I;
 - (b) a product fiche, as set out in Annex II, is made available;
 - (c) the technical documentation as set out in Annex III is made available on request to the authorities of the Member States and to the Commission;
 - (d) any advertisement for a specific model of vacuum cleaner contains the energy efficiency class, if the advertisement discloses energy-related or price information; and
 - (e) any technical promotional material concerning a specific model of vacuum cleaner which describes its specific technical parameters includes the energy efficiency class of that model.
2. The format of the label set out in Annex I shall be applied according to the following timetable
 - (f) for vacuum cleaners placed on the market from 1 January 2013 labels for vacuum cleaners with energy efficiency classes:
 - (i) A, B, C, D, E, F, G shall be in accordance with label 1 of Annex I or, where suppliers deem appropriate, with label 2 of that Annex;
 - (ii) A+, A++ shall be in accordance with label 2 of Annex I;
 - (iii) A+++ shall be in accordance with label 3 of Annex I;
 - (g) for vacuum cleaners placed on the market from 1 January 2014 with energy efficiency classes A++, A+, A, B, C, D, E, labels shall be in accordance with label 2 of Annex I or, where suppliers deem appropriate, with point 3 of that Annex;
 - (h) for vacuum cleaners placed on the market from 1 January 2016 with energy efficiency classes A+++, A++, A+, A, B, C, D labels shall be in accordance with label 3 of Annex I.

Chapter 4

Responsibilities of dealers

Dealers shall ensure that:

- (b) each vacuum cleaner, at the point of sale, bears the label provided by suppliers in accordance with Chapter 3(1) on the outside of the front or top of the vacuum cleaner, in such a way as to be clearly visible;
- (c) vacuum cleaners offered for sale, hire or hire-purchase where the end-user cannot be expected to see the product displayed, as specified in Article 7 of Directive 2010/30/EU; are marketed with the information provided by suppliers in accordance with Annex IV to this Regulation;
- (d) any advertisement for a specific model of vacuum cleaner contains a reference to the energy efficiency class, if the advertisement discloses energy-related or price information;
- (e) any technical promotional material concerning a specific model of vacuum cleaner which describes its specific technical parameters includes a reference to the energy efficiency class of the model.

Chapter 5

Measurement methods

The information to be provided under Chapters 3 and 4 shall be obtained by reliable, accurate and reproducible measurement procedures, which take into account the recognised state of the art measurement methods.

Chapter 6

Verification procedure for market surveillance purposes

Member States shall apply the procedure laid down in Annex V to assess the conformity of the declared energy efficiency class, cleaning performance classes on carpet and hard floor with crevice, dust pick up on carpet and hard floor with crevice, dust re-emission, annual energy consumption, and airborne acoustical noise emissions,.

Chapter 7

Revision

The Commission shall review this Working document in light of technological progress no later than five years after its entry into force. The review shall in particular assess the verification tolerances set out in Annex V.

Chapter 8

Transitional provision

Chapters 3(4d and e) and 4(b) shall not apply to printed advertisement and printed technical promotional material published before 1 May 2014.

However, this Regulation shall only apply to water filter vacuum cleaners from 1 January 2016.

Chapter 10

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*.

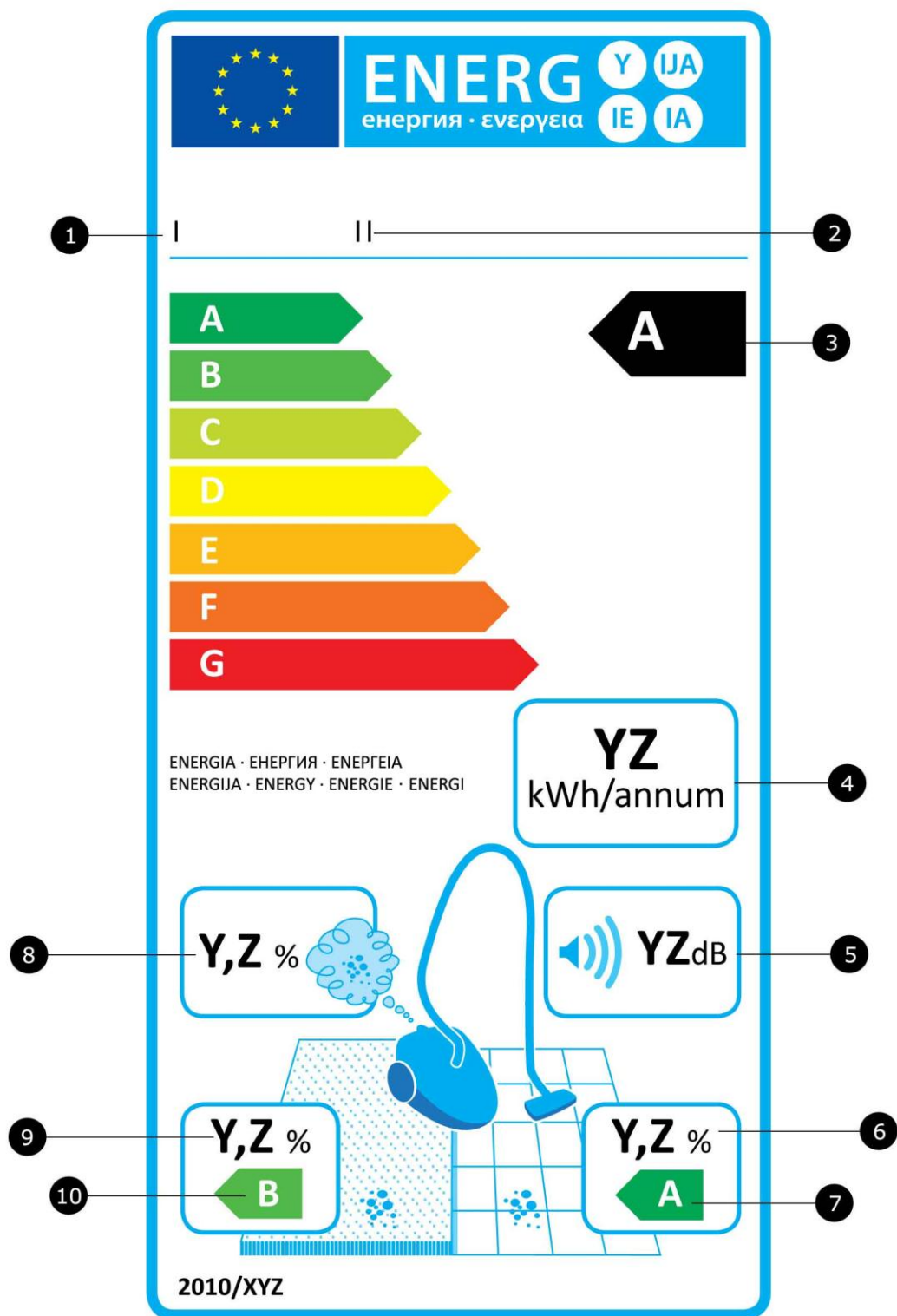
This Working document shall be binding in its entirety and directly applicable in all Member States.

Done in Brussels,

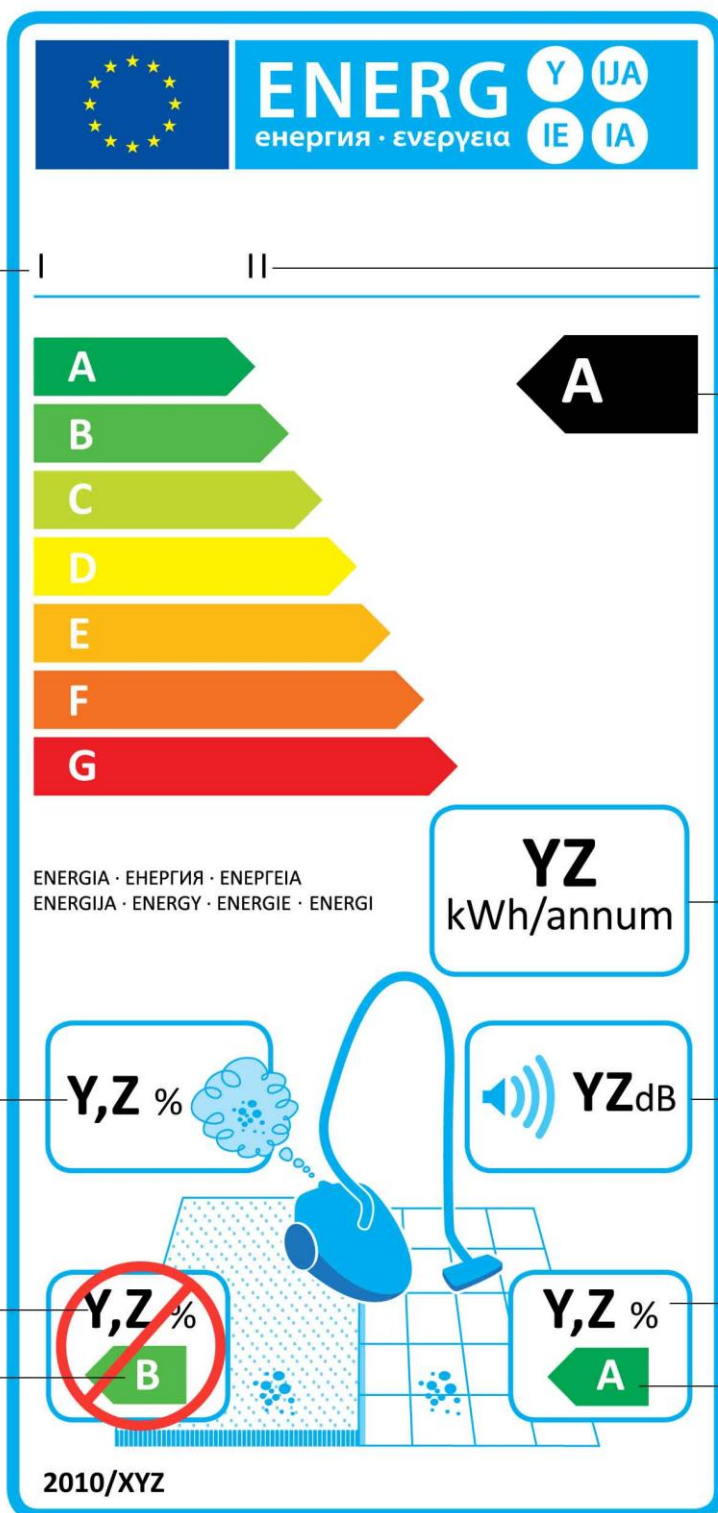
For the Commission
The President

ANNEX I
Label

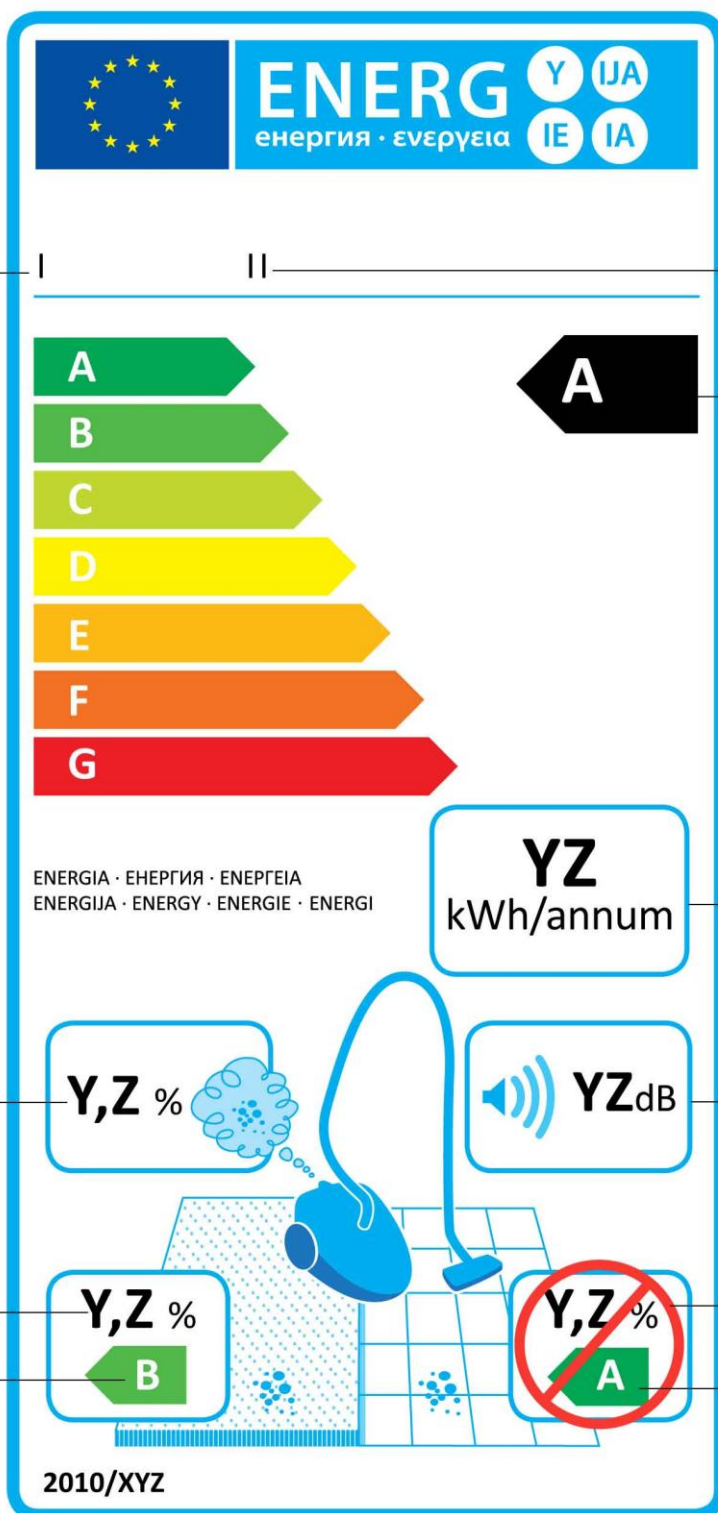
- 1. Label 1
- 1.1. General purpose vacuum cleaners



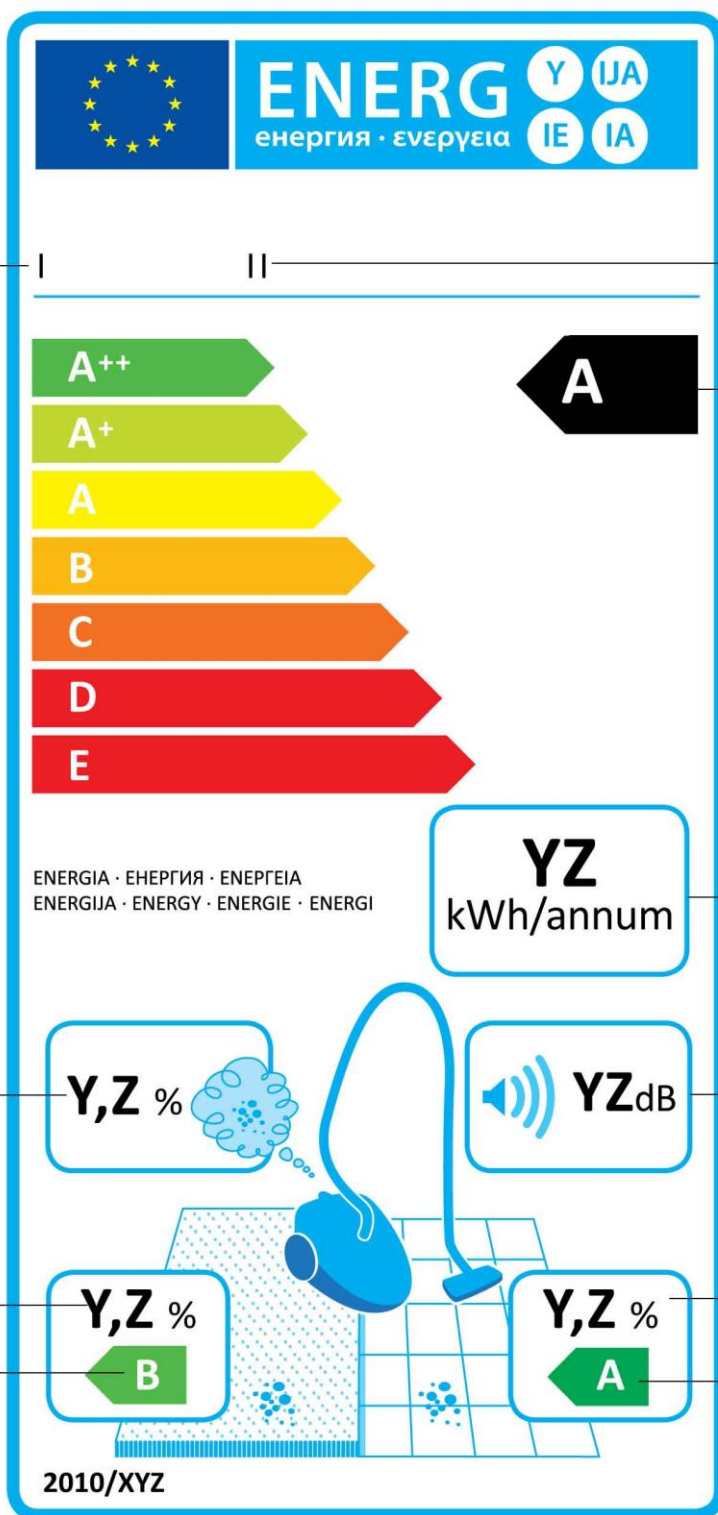
1.2. Hard floor only vacuum cleaners



1.3. Carpet only vacuum cleaners

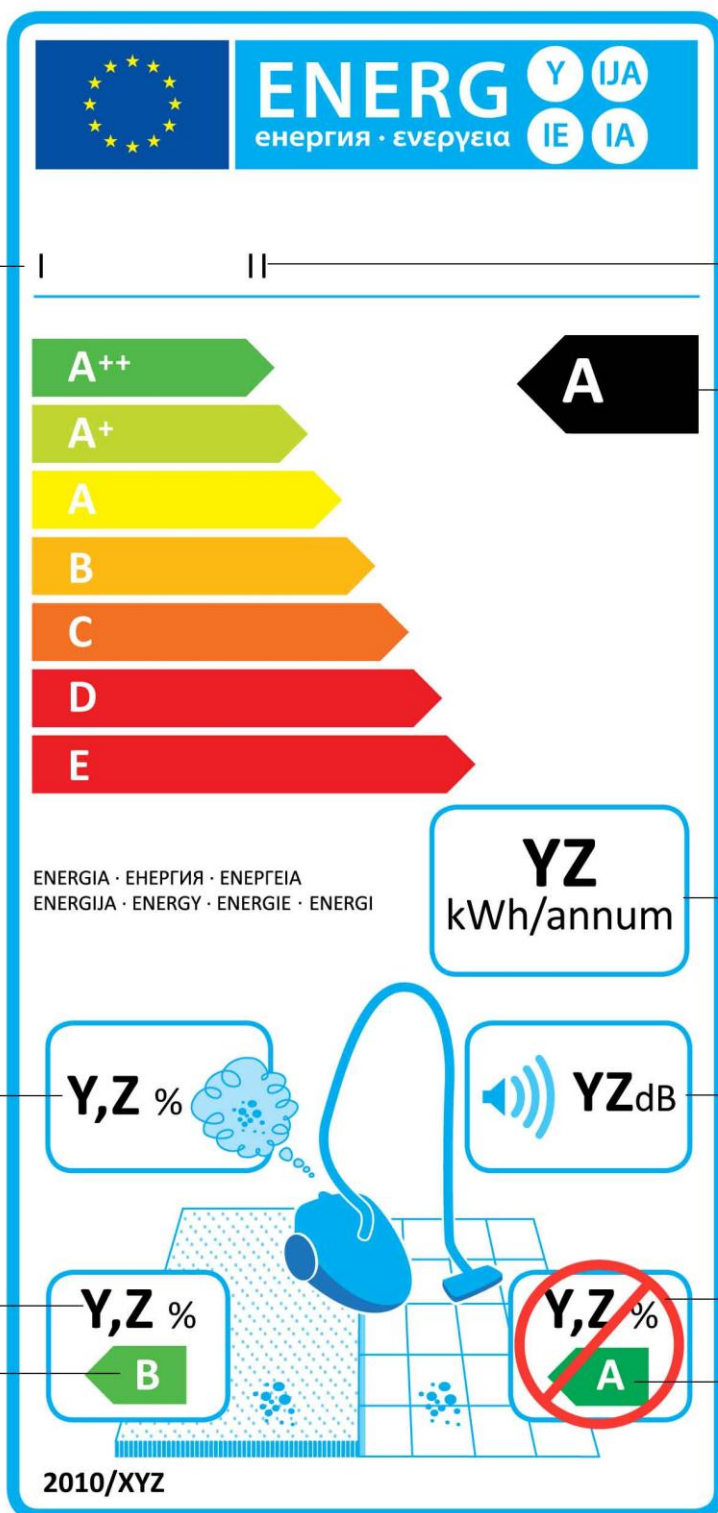


- 2. Label 2
- 2.1. General purpose vacuum cleaners (other than hard floor or carpet only)

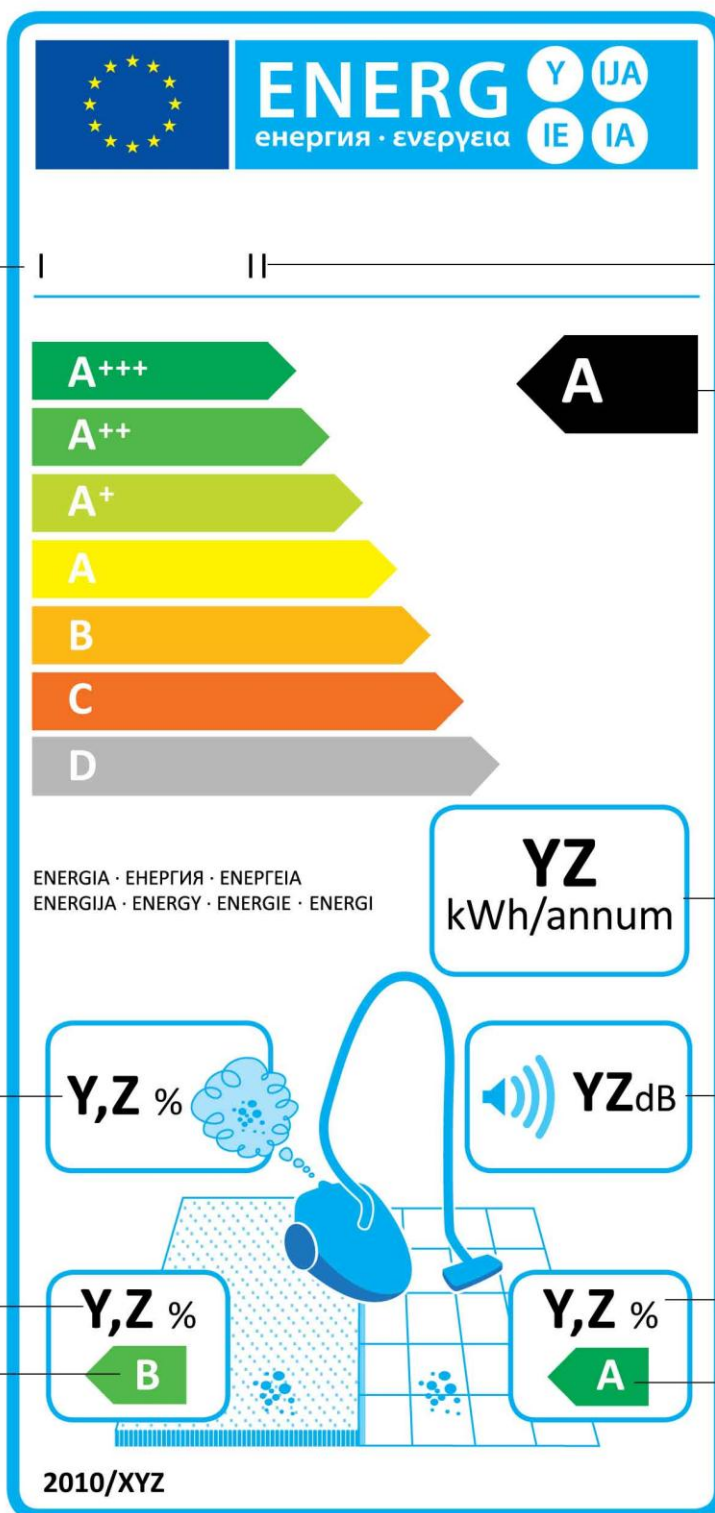


2.2. Hard floor vacuum cleaners

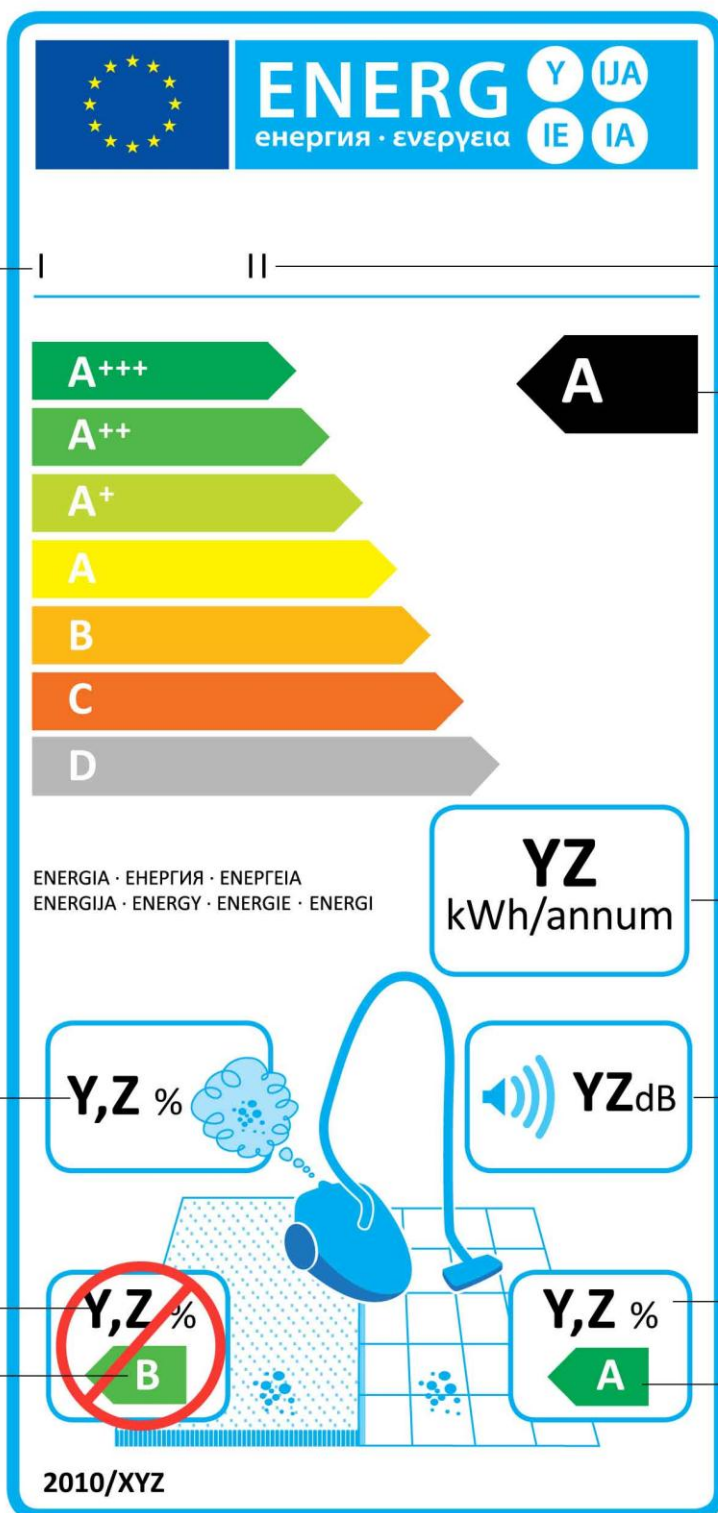
2.3. Carpet only vacuum cleaners



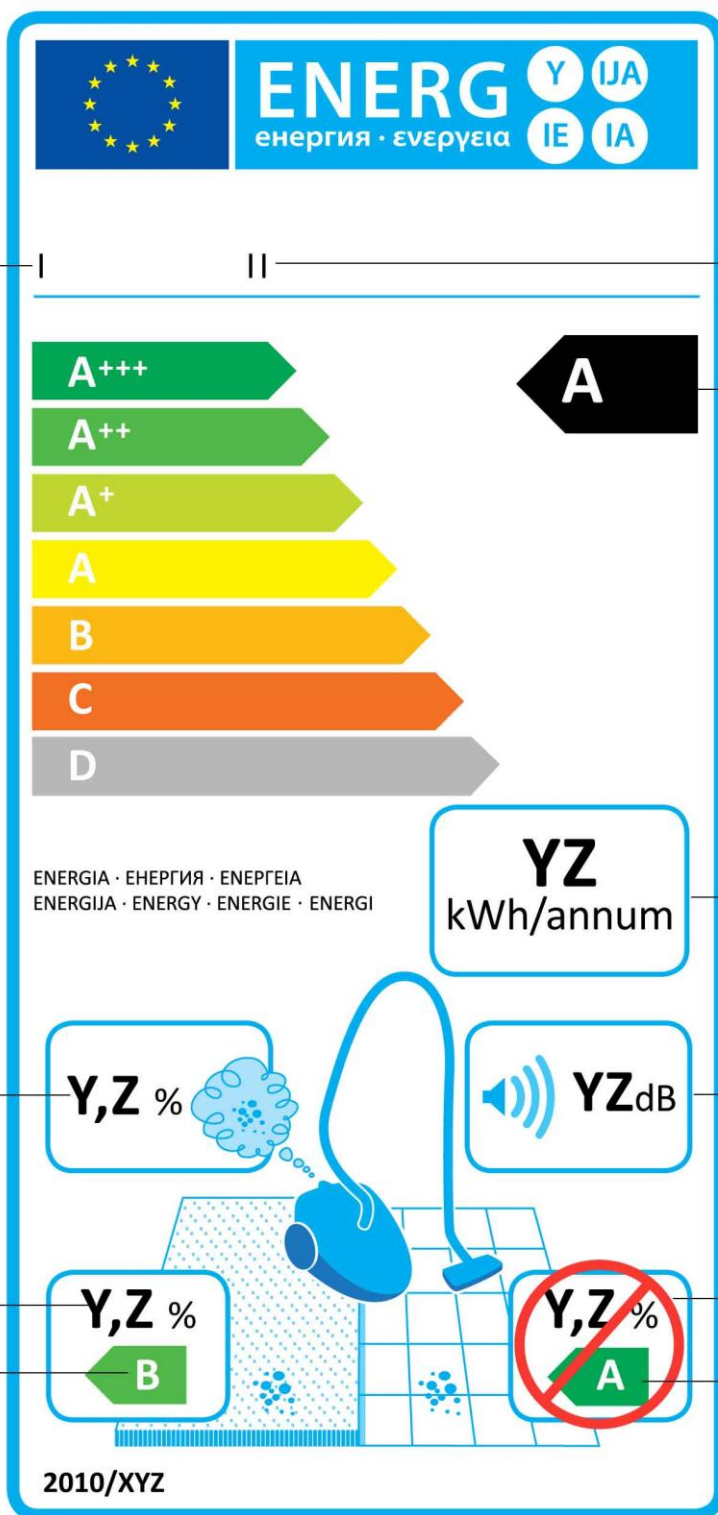
- 3. Label 3
- 3.1. General purpose vacuum cleaners



3.2. Hard floor vacuum cleaners



3.3. Carpet only vacuum cleaners



4. Notes on labels

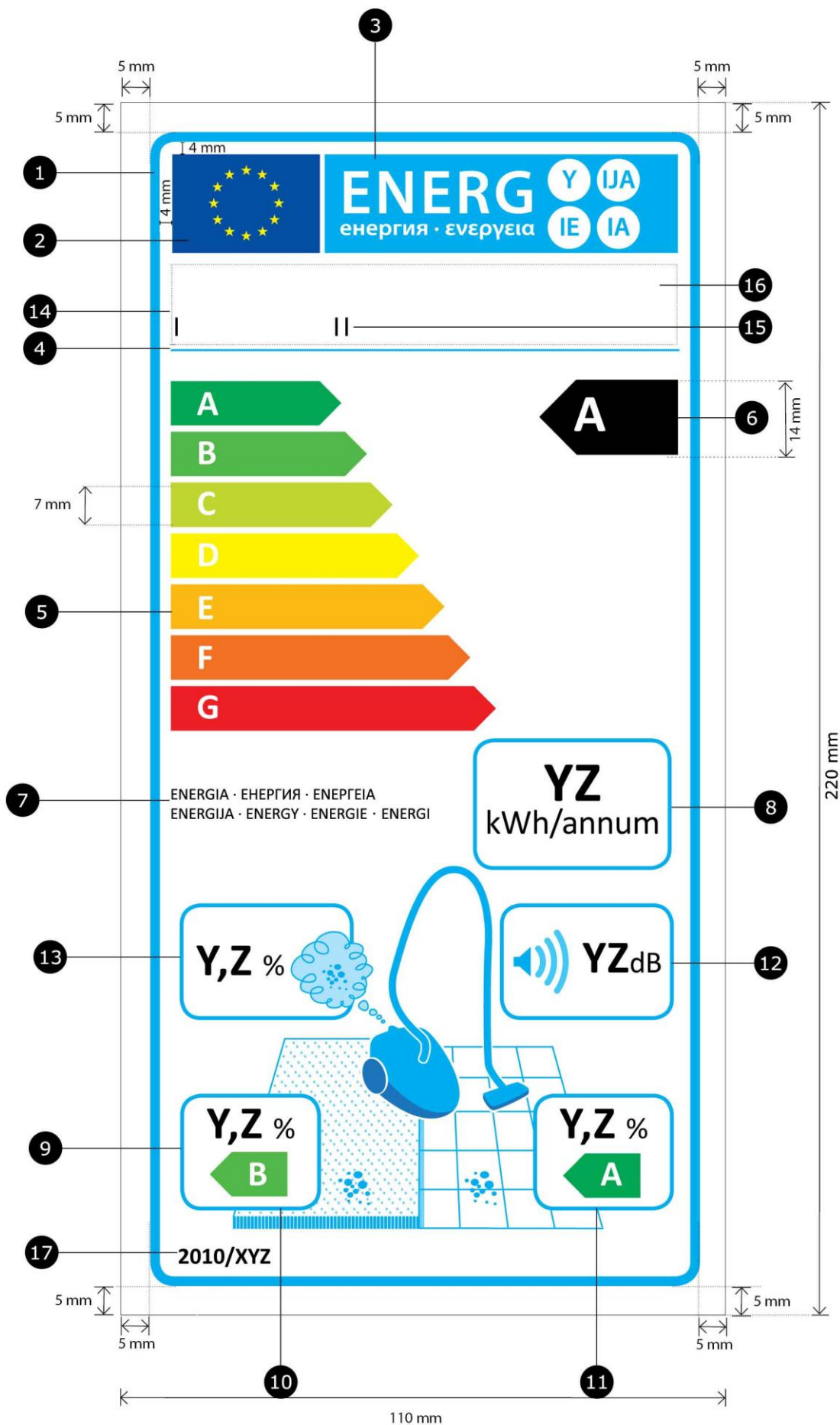
The following information shall be included in the label:

1. Supplier's name or trade mark;
2. Supplier's model identifier, where 'model identifier' means the code, usually alphanumeric, which distinguishes a specific vacuum cleaner model from other models with the same trade mark or supplier's name;
3. The energy efficiency class as defined in Annex VI; the head of the arrow containing the energy efficiency class of the vacuum cleaner shall be placed at the same height as the head of the arrow of the relevant energy efficiency class;
4. Average Annual Energy Consumption as defined in Annex;
5. Airborne acoustical noise emissions, expressed in dB (A) re 1 pW, rounded to the nearest integer;
6. Dust pick up (%) on hard floor as defined in Annex VII;
7. Hard floor cleaning class on a test hard floor with crevice, as defined in Annex VI;
8. Dust re-emission as defined in Annex VII;
9. Carpet cleaning class as defined in Annex VI;
10. Dust pick up (%) on carpet as defined in Annex VII.

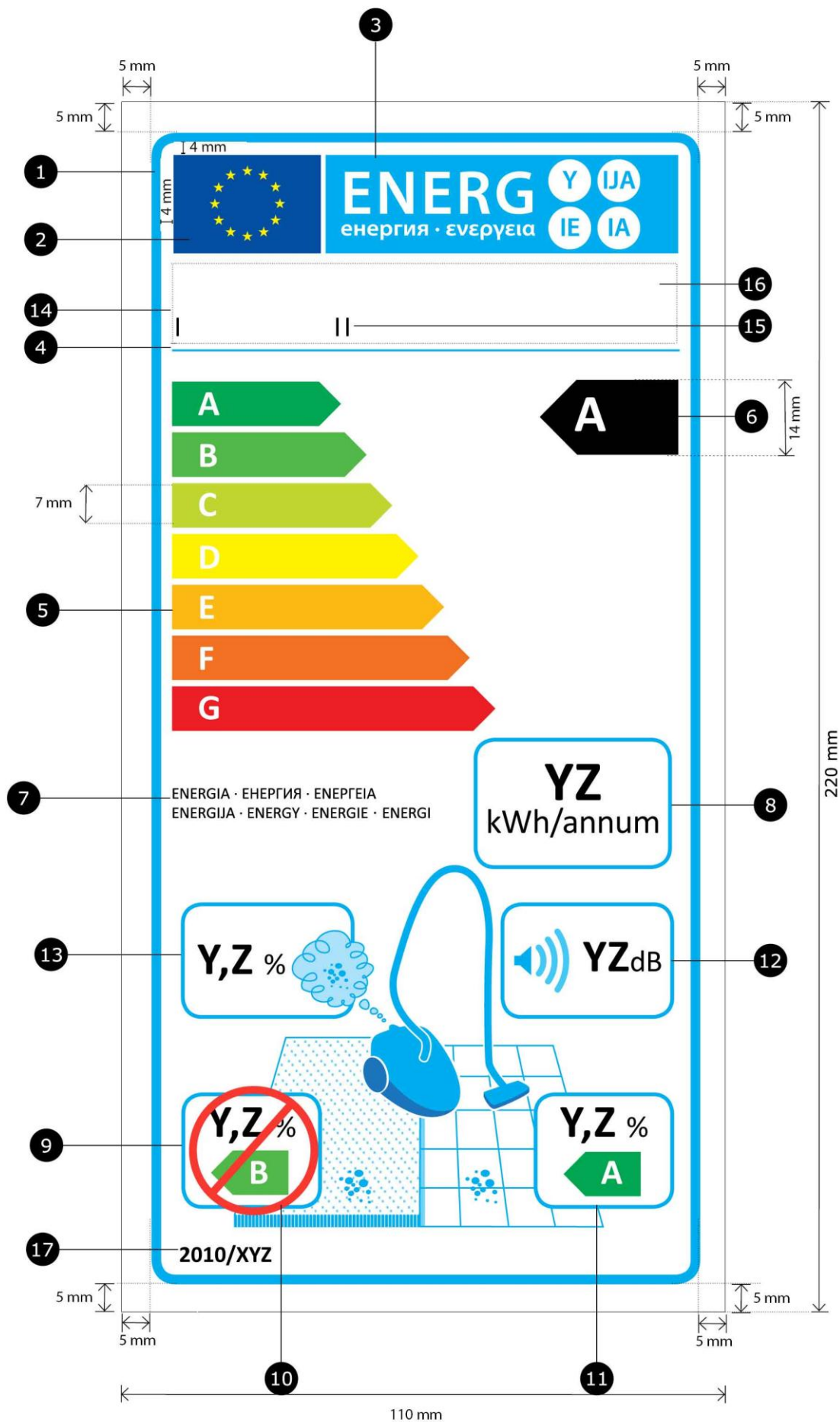
5. The design of the labels shall be in accordance with the following and with the design notes that follow. By way of derogation, where a model has been granted an ‘EU eco-label’ under Regulation (EC) No 66/2010¹¹ of the European Parliament and of the Council, a copy of the EU eco-label may be added.

Label 1.1

¹¹ OJ L



Label 1.2 (Hard floor)



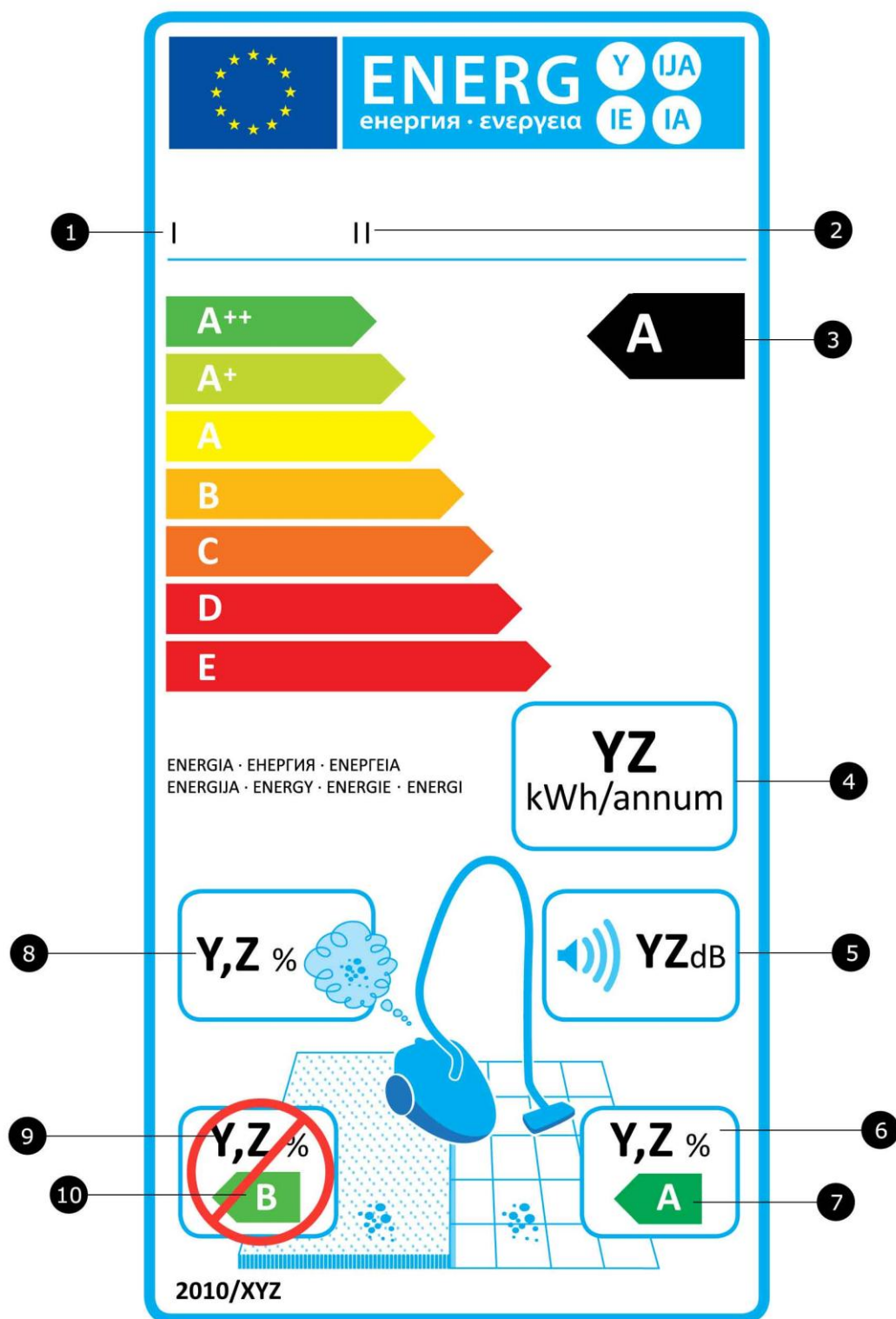
Label 1.3 (Carpet only)



Label 2.1



Label 2.2 (Hard Floor)



Label 2.3 (Carpet only)

Label 3.1

Label 3.2 (Hard Floor only)



Label 3.2 (Carpet only)

5.1. Design Notes

- (i) The label shall be at least 120 mm wide and 220 mm high. Where the label is printed in a larger format, its content shall nevertheless remain proportionate to the specifications above.
- (ii) The background shall be white.
- (iii) Colours are coded as CMYK — cyan, magenta, yellow and black, following this example: 00-70-X-00: 0 % cyan, 70 % magenta, 100 % yellow, 0 % black.
- (iv) The label shall fulfil all of the following requirements (numbers refer to the figure above):

❶ **EU label border stroke:** 5 pt – colour: cyan 100% – round corners: 3.5 mm;

❷ **EU logo:** Colours: X-80-00-00 and 00-00-X-00;

❸ **Energy label:** Colour: X-00-00-00;

Pictogram as supplied: EU logo + energy label:
width: 102 mm, height: 20 mm;

❹ **Sub-logos border:** 1 pt – colour: cyan 100% – length: 103,6 mm.

❺ **A++-G scale:**

- **Arrow:** height: 7 mm, gap: 1 mm – colours:
Highest class: X-00-X-00
Second class: 70-00-X-00,
Third class: 30-00-X-00,
Fourth class: 00-00-X-00,
Fifth class: 00-30-X-00,
Sixth class: 00-70-X-00,
Last class(es): 00-X-X-00. (for labels 1 and 2)
00-00-00-30 (for label 3)
Text: Calibri bold 16, capitals, white;

❻ **Energy efficiency class**

- **Arrow:** width: 26 mm, height: 14 mm, 100% black;
- **Text:** Calibri bold 29 pt, capitals, white; '+' symbols : Calibri bold 18 pt, white aligned on a single row;

❼ **Energy**

- **Text:** Calibri regular 9 pt, capitals, black;

❽ **Annual consumption in kWh/annum:**

- **Text 'kWh/annum':** Calibri regular 10 pt, 100% black;
- **Value 'XY':** Calibri bold 30 pt, 100% black;
- **'kWh/annum':** Calibri bold 16 pt, 100% black;

❾ & ❿ **Performance on Carpet and Hard Floor (respectively):**

- **Border:** 2 pt – colour: cyan 100% – round corners: 3.5 mm;

- **Value:** Calibri bold 24 pt, 100% black; '%' Calibri regular 16pt, 100% black;
Arrow: width: 13 mm, height: 7 mm, colour:
A: X-00-X-00
B: 70-00-X-00,
C: 30-00-X-00,
D: 00-00-X-00,
E: 00-30-X-00,
F: 00-70-X-00,
G: 00-X-X-00;
Arrow text: Calibri bold 16 pt, capitals, white;

⑪ Exclusion sign:

- **Border:** 4 pt – colour: 00-X-X-00 (100% red) – Diameter 22mm;

⑫ & ⑬ Noise emissions and dust re-emission:

- **Border:** 2 pt – colour: cyan 100% – round corners: 3.5 mm;
- **Value:** Calibri bold 15 pt, 100% black;
'%' and 'dB' Calibri regular 12pt, 100% black;

⑭ & ⑮ Supplier's name or trademark and model identifier:

- The suppliers' name or trade mark and model identifier should fit in a space of 102x 13 mm;

⑯ Reference period:

- **Text:** Calibri bold 10.

ANNEX II

Fiche

1. The information in the product fiche of the vacuum cleaners shall be given in the order specified in points (a) to (j):
 - (a) Supplier's name or trade mark;
 - (b) Supplier's model identifier which means the code, usually alphanumeric, which distinguishes a specific vacuum cleaner model from other models with the same trade mark or supplier's name;
 - (c) Energy efficiency class;
 - (d) Average Annual Energy Consumption (AE_C) in kWh/year, rounded to the one decimal place, as defined in Annex VII; it shall be described as: 'Indicative annual energy consumption 'Y' kWh per year, based on 50 cleaning tasks. Actual annual energy consumption will depend on how the appliance is used.';
 - (e) Cleaning performance classes and dust pick up (%) carpet and hard floor (with crevice), as defined in Annexes VI and VII;
 - (f) For 'hard floor' vacuum cleaners, declaration 'not suitable for use on carpets';
 - (g) for 'carpet' vacuum cleaners, declaration 'not suitable for use on hard floors';
 - (h) Dust re-emission as defined in Annex VII (h) Where the vacuum cleaner has been granted an 'EU Eco-label award' under Regulation (EC) No 66/2010¹² of the European Parliament and of the Council of 25 November 2009 on the EU Ecolabel, this information may be included;
 - (i) Rated input power, as defined in Annex I, point 4;
 - (j) Airborne acoustical noise emissions expressed in dB(A) re 1 pW and rounded to the nearest integer.
2. One fiche may cover a number of vacuum cleaner models supplied by the same supplier.
3. The information contained in the fiche may be given in the form of a copy of the label, either in colour or in black and white. Where this is the case, the information listed in point 1 not already displayed on the label shall also be provided.

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ANNEX III
Technical documentation

1. The technical documentation referred to in Chapter 3 (3) shall include:
 - (k) The name and address of the supplier;
 - (l) A general description of the vacuum cleaner type and/or model and/or commercial code, sufficient for it to be unequivocally and easily identified;
 - (m) Where appropriate, the references of the harmonised standards applied;
 - (n) Where appropriate, the other technical standards and specifications used;
 - (o) Identification and signature of the person empowered to bind the supplier;
 - (p) Technical parameters for measurements as follows (after 5 double strokes):
 - (i) specific energy consumption on test carpet, where applicable;
 - (ii) specific energy consumption on test hard floor with crevice, where applicable;
 - (iii) dust pick up on carpet and hard floor with crevice as applicable;
 - (iv) dust re-emission as defined in Annex VII;
 - (v) airborne acoustical noise;
 - (g) test reports used to establish these parameters;
 - (h) the results of calculations performed in accordance with Annex VII.
2. Where the information included in the technical documentation file for a particular vacuum cleaner model has been obtained by calculation on the basis of design, or extrapolation from other equivalent vacuum cleaner or both, the documentation shall include details of such calculations or extrapolations or both, and of tests undertaken by suppliers to verify the accuracy of the calculations undertaken. The information shall also include a list of all other equivalent vacuum cleaner models where the information was obtained on the same basis.

ANNEX IV

Distance selling and other forms of selling where end-users cannot be expected to see the product displayed

1. The information referred to in Chapter 4(b) shall be provided in the following order:
 - (q) The energy efficiency class as defined in Annex VI;
 - (r) Cleaning performance classes and dust pick up on carpet and/or hard floor (with crevice), as defined in Annex VI;
 - (s) The average Annual Energy Consumption (AE) in accordance with Annex VII
 - (t) Dust re-emission as defined in Annex VII;
 - (u) Rated input power, as defined in Annex I, point 4;
 - (v) Airborne acoustical noise emissions expressed in dB(A) re 1 pW and rounded to the nearest integer;
2. Where other information contained in the product information fiche is also provided, it shall be in the form and order specified in Annex III;
3. The size and font in which all the information referred in this Annex is printed or shown, shall be legible (minimum height 3 mm).

ANNEX V

Verification procedure for market surveillance purposes

For the purposes of checking conformity with the requirements laid down in Directive 2010/30/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 II of this Regulation and whether the values declared¹³ in accordance with Annexes II are correct:

A. Consistency of declared values

1. The authorities of the Member State shall collect declarations provided in accordance with this regulation (or provided in accordance with any implementing legislation under Directive 2009/125/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 power¹⁴.
2. However, if on the basis of the calculations contained in the technical documentation¹⁵, this difference is explained by rounding of declared values in accordance with the requirements of this regulation, 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). If a declared value is more favourable to the supplier than the average (rounded in accordance with this regulation) of the relevant test results included in the technical documentation¹⁶, 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

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

¹³ Declared values includes not only the values of parameters to be declared, but also the classifications (A+++ or A to G) ratings for Energy consumption, and dust pick up.

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¹⁵ See Annex III g

¹⁶ See Annex III g

2. 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.
3. 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.
4. 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.
5. 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.
6. 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

8. 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 regulation. 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.
9. 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 Regulation, Member State authorities shall use the measurements, calculation methods, technical definitions and equations set out in annex VII.

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

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

⁽¹⁾ 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.

⁽²⁾ “declared value” means a value that is declared by the manufacturer.

ANNEX VI
Energy efficiency and cleaning performance classes

1. ENERGY EFFICIENCY CLASSES

The energy efficiency class of a vacuum cleaner shall be determined in accordance with its Annual Energy Consumption as set out in Table 1.

The Annual Energy Consumption of a vacuum cleaner shall be determined in accordance with point 1 of Annex II.

Table 1: Energy efficiency classes

Energy Efficiency Class	Annual Energy Consumption	
	min	max
	kWh/yr	kWh/yr
A+++		14
A++	14	18
A+	18	22
A	22	28
B	28	35
C	35	44
D	44	52
E	52	62
F	62	78
G	78	∞

2. DUST REMOVAL PERFORMANCE CLASSES

The dust removal performance class of a vacuum cleaner shall be determined in accordance with the dust removal ability after one cleaning cycle on a test carpet (D_c) and on a test hard floor with crevice (D_{hf}) as set out in Table 2.

The dust removal ability of a vacuum cleaner on a test carpet (D_c) and on a test hard floor with crevice (D_{hf}) shall be determined in accordance with Annex II, point 2.

Table 2: Dust Removal Performance Classes

Dust removal performance class	Dust pick up on carpet (dpu_c)	Dust pick up on hard floor with crevices (dpu_{hf})
A (most efficient)	>85%	>100%
B	>75%	>95%
C	>65%	>90%
D	>55%	>85%
E	>45%	>80%
F	>35%	>75%
G (least efficient)	≤35%	≤75%

The calculation of this ratio is done

- For carpet D_c is dust pick up/65
- For hard floor D_{hf} is dust pick up/95

3. DUST RE-EMISSION

The dust re-emission of a vacuum cleaner (0.4-10 μ) shall be declared as absolute percentage of particles in the size range 0.4-10 μ in accordance with the definition in Chapter 1(16), rounded to 2 significant places.

ANNEX VII

MEASUREMENT AND CALCULATION METHODS

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 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 Regulation, in particular this annex VII, 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.

1. Technical definitions:

- (10) “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;
- (11) “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;
- (12) “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;
- (13) “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;
- (14) “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;
- (15) “cleaning head width” (HW) in m with 3 decimal precision is the external maximum width of the cleaning head;
- (16) “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;
- (17) “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](9)

- (18) “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;
- (19) “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°) 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;
- (20) “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;
- (21) “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);
- (22) “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;
- (23) “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);
- (24) “equivalent battery power consumption” (NP) in W at 2 decimal precision is E [Wh] divided by t_{tot} [h];
- (25) “specific energy consumption” (SE) in Wh/m² at 2 decimal precision is the average electricity consumption, excluding electricity consumption in acceleration zones, per square meter of test area surface covered [m²];
- (26) “specific energy consumption hard floor test” (SE_h) in Wh/m² is the average SE during the three cleaning cycles that constitute the hard floor test;
- (27) “specific energy consumption carpet test” (SE_c) in Wh/m² is the average SE during the three cleaning cycles that constitute the carpet test;
- (28) “average specific energy consumption” (SE_a) in Wh/m² for vacuum cleaners designed for cleaning both hard floors and carpets is the sum of $0,5SE_h$ and $0,5SE_c$;
- (29) “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} ;

- (30) “rated input power” (P_{rated}) in W is the input electric input power declared by the manufacturer;
- (31) “noise power” is airborne acoustical noise emissions, expressed in dB(A) re 1 pW and rounded to the nearest integer;
- (32) “annual energy consumption” (AE) in kWh/a is the specific energy consumption SE multiplied by 87 m² 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);
- (33) “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;
- (34) “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;
- (35) “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;
- (36) “calibrated dust pick-up” (K_c) is the calibrated dust pick-up of the reference vacuum cleaner system used for testing;

2. 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/m² carpet test area;
- SE_{hf} is average Specific Energy consumption in Wh/m² 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 m²;
- 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/m² 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 center of the cleaning head is passing over the test area;
- A is the surface area in m² 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.

- 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' through the equation

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

Values of dpu_c , dpu_c' , K_{ref} and K_c shall be included in the technical documentation.