



EUROPEAN COMMISSION  
DIRECTORATE-GENERAL FOR ENERGY

Directorate C - New and renewable sources of energy, Energy efficiency & Innovation  
**C.3 - Energy efficiency of products & Intelligent Energy – Europe**

**Annex 1**

**WORKING DOCUMENT**  
**on the ecodesign and labelling of household tumble driers**

**Presented by the Directorate General for Energy  
for Consultation Forum on Friday 25 June 2010**

As announced in the Commission *Communication on the Establishment of the working plan for 2009-2011 under the Ecodesign Directive*<sup>1</sup>, in accordance with to Article 16(2) of the Ecodesign Directive 2009/125/EC<sup>2</sup>, the Commission is assessing the possible introduction of an implementing measure on the ecodesign of household tumble driers.

The update of *Commission Directive 95/13/EC of 23 May 1995 implementing Council Directive 92/75/EEC with regard to energy labelling of household electric tumble driers*<sup>3</sup> should also be considered in line with the adoption of the recast Labelling Directive<sup>4</sup>.

In accordance with Article 18 of the Ecodesign Directive 2009/125/EC and Article 10(3) (c) of the recast Labelling Directive, the Commission is seeking views of interested parties on the ecodesign and labelling of household tumble driers.

Consultation of stakeholders is open on the CIRCA web site: <http://circa.europa.eu/>.

Comments can be sent to [alix.chambris@ec.europa.eu](mailto:alix.chambris@ec.europa.eu) by 21 June 2010 so as to allow for a structured discussion in the meeting.

The Commission will publish position papers on the above web site except for specific request for confidentiality.

Published on 31.05.2008

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1 COM(2008)660

2 OJ L 285, 31.10.2009, p. 10–35.

3 OJ L 47, 24.2.1996, p. 35.

4 <http://www.europarl.europa.eu/oeil/FindByProcnum.do?lang=en&procnum=COD/2008/0222>

## NOTICE

*The document is seeking stakeholders' comments to support the preparation of an implementing measure on the ecodesign and/or labelling of household tumble driers. It does not prejudge the final form of any decision to be taken by the Commission and nobody can claim any rights from its content.*

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## 1. POLICY BACKGROUND

Household tumble driers are covered by *Commission Directive 95/13/EC of 23 May 1995 implementing Council Directive 92/75/EEC with regard to energy labelling of household electric tumble driers*<sup>5</sup>. No ecodesign requirements implementing Directive 2009/125/EC (former Directive 2005/32/EC) have been set for the time being on this product group.

In accordance with Article 16(2) of the Ecodesign Directive 2009/125/EC, the *Action Plan for Energy Efficiency: Realising the Potential*<sup>6</sup> identified 'wet' household appliances as one of the 14 priority product groups for which an up-date of the existing energy label together with minimum energy performance standards may be adopted.

### 1.1. Grounds for an implementing measure on ecodesign

Directive 2009/125/EC<sup>7</sup> of the European Parliament and of the Council lays down a framework for the Commission, assisted by a Regulatory Committee, to set eco-design requirements for energy-related products. Ecodesign requirements are requirements that the products covered by implementing measures must meet in order to be placed on the market with the aim of improving by product design their environmental performance throughout their lifecycle.

Article 15(2) of Directive 2009/125/EC sets the criteria upon which a new implementing measure on ecodesign may be adopted (in particular significant volume of sales and trade, significant environmental impact, significant potential for improvement 'without entailing excessive costs' and assessment of impacts).

A technical, environmental and economical analysis (hereafter 'preparatory study'<sup>8</sup>) has shown that:

- (i) household tumble driers, with more than 3.800.000 units sold in 2007, are placed in large quantities on the EU market;
- (ii) the environmental impact of household tumble driers in the EU is significant; in particular the electricity consumption in the use phase which was estimated to be 17 TWh annual electricity consumption (corresponding to 8,5 Mt CO<sub>2</sub> equivalent) in 2005;
- (iii) there are wide disparities in the environmental performance of household tumble driers.

However, as highlighted in Article 15(2) (c) "the product shall present significant potential for improvement without entailing excessive costs" and the level of energy efficiency requirements set out in an implementing measure must "aim at the life cycle costs minimum to end-users for representative product models" (fifth paragraph of point 1 of Annex II of the Ecodesign Directive).

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5 OJ L 47, 24.2.1996, p. 35.

6 COM(2006) 545.

7 OJ L 285, 31.10.2009, p. 10–35.

8 Available on [www.ecodryers.org](http://www.ecodryers.org)

## **1.2. Cost-effectiveness of technologies improving the environmental impact of household tumble driers**

The life cycle analysis performed in task 5 of the preparatory study showed that the most significant environmental impact of household tumble driers is the energy consumption in the use phase. The issue of refrigerant gases for heat pump household tumble driers is not considered as significant, as it is kept in a sealed environment until the final disposal of the appliance. Leakage is in practice very limited during the life time of the product. In addition, according to stakeholders input, the two refrigerants used in household tumble driers have similar global warming potential presenting limited scope for improvements. Finally, Regulation (EC) No 842/2006 of 17 May 2006 on certain fluorinated greenhouse gases already addresses the containment, use, recovery and destruction of the fluorinated greenhouse gases listed in its Annex I; the labelling and disposal of products and equipment containing those gases; the reporting of information on those gases.

The analysis of technologies that reduce the energy consumption of household tumble driers demonstrated that all improvements options lead to a life cycle cost superior to the one of the base case (the average product representative of the market) with pay back periods exceeding 13 years (see table 124 of task 7, p. 361).

Only heat pump electric tumble driers can achieve the energy class A with a price twice as high as the price of vented or condenser driers mostly populated in class C (see table 30 of task 2, p.103). Gas fired household tumble driers, currently a niche market, could achieve class A and beyond at a lower price but may not always be appropriate for end-users as they are only air vented and need appropriate installation including the availability of gas supply to dwellings.

Against this background, ecodesign requirements with regard to the energy consumption of household tumble driers could ban current classes D to G of the current labelling scheme, representing less than 10% of the market in 2005 (less than 5% today) with an annual savings potential by 2020 of 0.5 TWh (see task 8 report).

Class C could possibly be banned but this would imply banning almost entirely vented tumble driers which are today the cheapest household tumble driers available on the market. This raises question of proportionality and affordability to consumers, in particular low budget families and households where the use of a household tumble drier is limited due to more favourable climatic conditions.

It is considered at this stage that the conditions are not met to justify the adoption of an implementing measure on the ecodesign of household tumble driers. It is proposed instead to up-date the energy labelling Directive 95/13/EC. Since heat pump tumble driers are increasingly gaining market share as compared to conventional driers (condenser and air vented), a revision of the current energy label could speed up the market transformation towards those more energy efficient driers which is likely in turn to lead to a significant fall of their price. The adoption of an ecodesign implementing measure could therefore be reconsidered at a later stage.

Stakeholders are requested to express their views on this proposal.

### **1.3. Grounds for an implementing measure on labelling**

The preparatory study on household tumble driers highlighted that those equipped with heat pumps may achieve energy consumption levels way beyond current class A. With the current Labelling Directive 95/13/EC - limited to the A class - the up-take of the most efficient products is currently hindered by the impossibility to convey that information to consumers.

Further to the adoption of the recast labelling Directive and the coming adoption of the revised labelling delegated Regulations on other wet appliances (household washing machines and dishwashers) further to the positive vote of the Regulatory Committee on 28 May 2010, there is scope to up-date the current energy label of household tumble driers to the new label layout which opens the label to products "better than A".

Since household tumble driers clearly meet the criteria listed in Article 10(2) of the recast Labelling Directive as highlighted in section 1.1 above, it is considered to propose a delegated Regulation on the energy labelling of household tumble driers and seek stakeholders views on the attached first draft Regulation (see Annex).

## **2. LEGAL ELEMENTS OF THE PROPOSAL ON ENERGY LABELLING (ANNEX)**

### **2.1. Scope**

It is proposed to include gas fired household tumble driers into the labelling scheme and include them on one common energy classification together with electric household tumble driers in order to allow easy comparison for end-users. Gas tumble driers consume significantly less than conventional household electric tumble driers at a cost effective level but have failed to gain market share<sup>9</sup> mainly because they cannot be used in dwellings where gas is not available and partly because they are not included yet in the energy label.

The safety of gas household tumble driers is already covered by Directive 2009/142/EC of the European Parliament and of the Council of 30 November 2009 relating to appliances burning gaseous fuels<sup>10</sup>.

### **2.2. Calculation method for the energy efficiency index and energy efficiency classes**

A revised calculation method for the energy efficiency index is introduced with the view to align the methodology to the revised delegated Regulations on the energy labelling of household washing machines and dishwashers. The new formula is based on 160 drying cycles per year (on the basis of the average consumer behaviours identified in the preparatory study), includes low power modes (left-on mode and off-mode) and a combination of full and partial load. Compared to the current Directive 95/13/EC (that is based on the energy consumption per kg of dried load, irrespective of the machine capacity), the new reference line (standard annual energy consumption) is more severe for larger household tumble driers and slightly less for smaller household tumble driers. With the new reference line, the overall annual energy consumption necessary to reach one energy efficiency class would be a function of the rated

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<sup>9</sup> Household gas tumble driers represent less than 1% market share in the EU but reached around 20% market share in the USA for example.

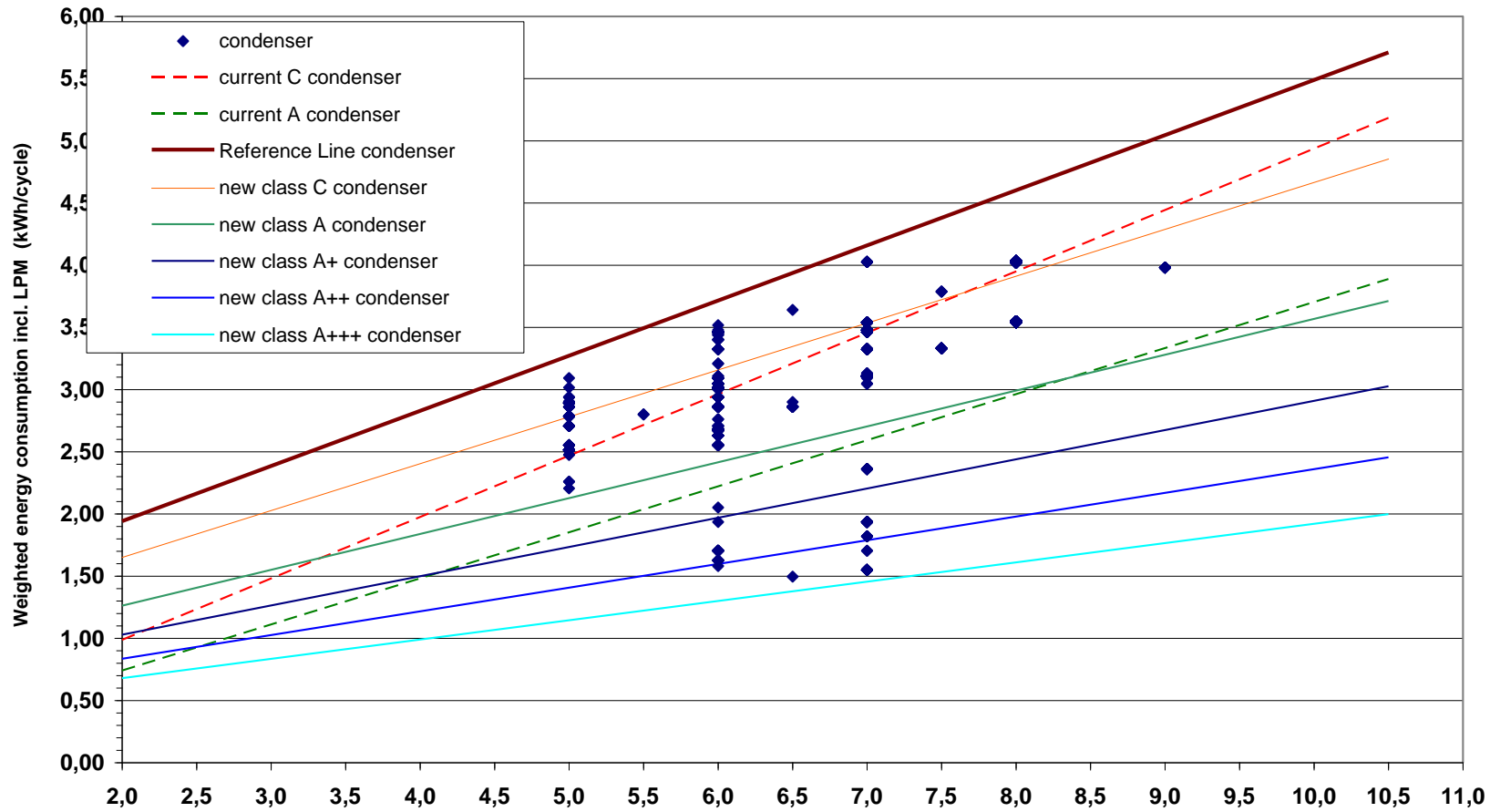
<sup>10</sup> OJ L 330, 16.12.2009, p. 10.

capacity of the household tumble drier; as a consequence, when evaluated on a per kg of dried laundry, larger household tumble driers would be forced to consume less than a smaller household tumble drier in one given energy class.

An alternative formula could be considered based on a fixed amount of laundry dried per year in kg in line with the current Directive 95/13/EC but it is considered to be less relevant for consumers who usually dry the same amount of wet laundry washed by their household washing machine. Under the alternative formula, the annual energy consumption necessary to reach one energy efficiency class would also depend on the rated capacity of the household tumble drier; but a larger household tumble drier would be allowed to consume more per cycle than a smaller one for a same energy class.

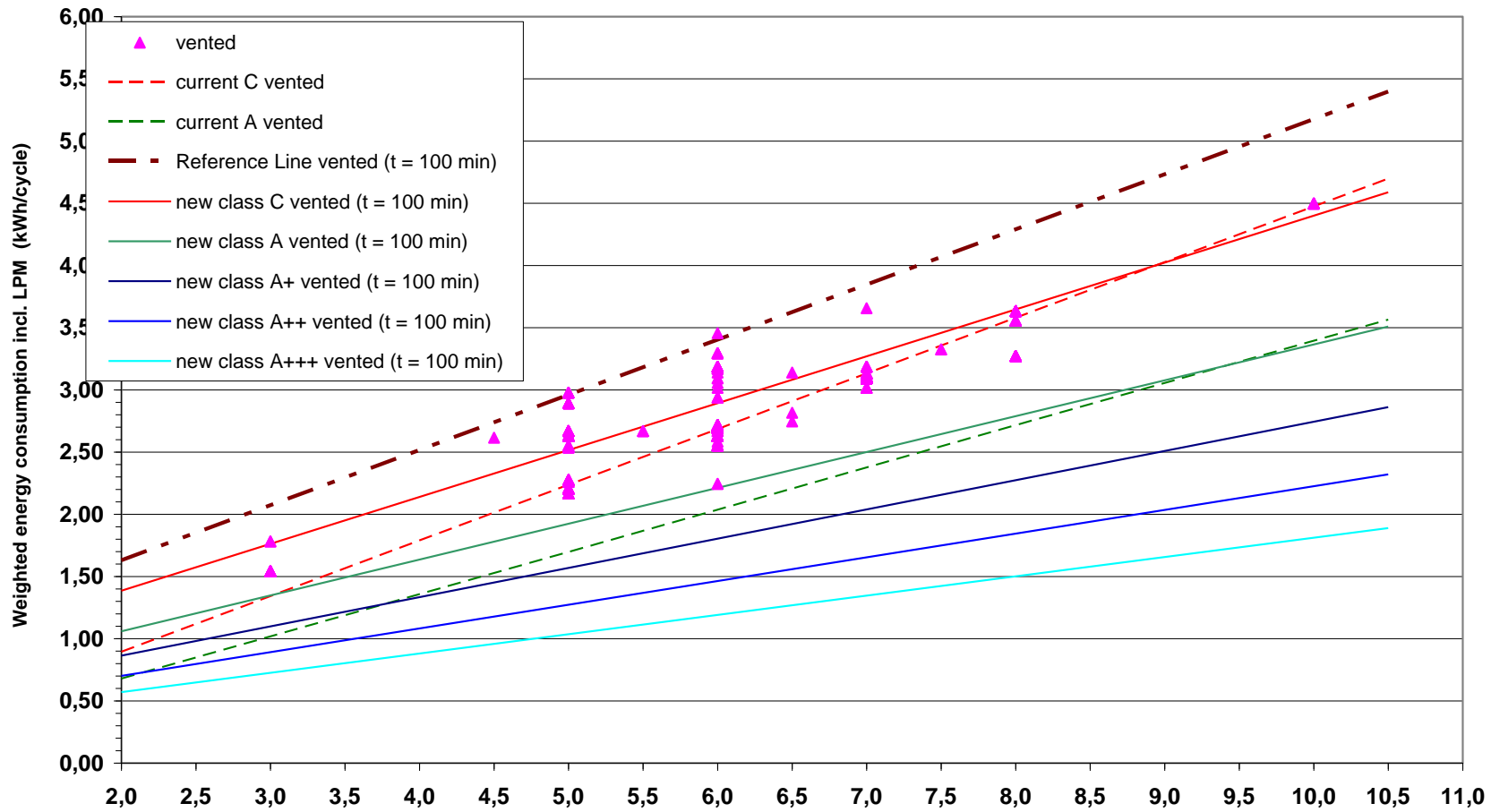
Building on the current A-G label of Directive 95/13/EC, three classes are added so as to allow for the market take up of more energy efficient appliances. The best heat pump or gas household tumble driers currently on the market would reach class A++ in the proposed classification as illustrated in the two graphs below.

**Graph 1: Proposed new reference line ( $SAE_C$ ) and energy efficiency classes for household condenser tumble driers based on 2008 market data<sup>11</sup>**



<sup>11</sup> The energy consumption in kWh/cycle of the household tumble driers provided on this graph has been adjusted in order to include low power modes. The calculation is based on 160 cycles per year assuming 13,5 kWh low power modes consumption. N.b.: The energy consumption of low power modes should gradually fall around 5 kWh further to the entry into force of the stand-by regulation as most household tumble driers have no sensor based safety function and therefore fall into its scope.

**Graph 2: Proposed new reference line (SAE<sub>C</sub>) and energy efficiency classes for household vented tumble driers based on 2008 market data<sup>12</sup>**



<sup>12</sup> See footnote 11.



### **2.3. Energy label**

It is proposed to have one label per type of appliance (electric air-vented, gas air-vented or electric condenser) sharing one common energy classification.

The programme time and condensation efficiency for condenser household tumble driers are added on the label in addition to rated capacity, airborne acoustical noise and the energy consumption per cycle which were already included on the current energy label.

**3. ANNEX: DRAFT COMMISSION DELEGATED REGULATION IMPLEMENTING DIRECTIVE 2010/.../EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL WITH REGARD TO ENERGY LABELLING OF HOUSEHOLD TUMBLE DRIERS**

*Article 1*

*Subject matter and scope*

1. This Regulation establishes requirements for the labelling and the provision of supplementary product information on electric mains-operated and gas fired household tumble driers including those sold for non-household use and built-in household tumble driers.
2. This Regulation shall not apply to household combined washer-driers and household spin-extractors.

*Article 2*

*Definitions*

In addition to the definitions laid down in Article 2 of Directive 2010/.../EU, the following definitions shall apply for the purposes of this Regulation:

- (1) “household tumble drier” means an appliance in which textiles are dried by tumbling in a rotating drum, through which heated air is passed;
- (2) “built-in household tumble drier” means a household tumble drier intended to be installed in a cabinet, a prepared recess in a wall or a similar location, requiring furniture finishing;
- (3) “household combined washer-drier” means a household washing machine which includes both a spin extraction function and also a means for drying the textiles, usually by heating and tumbling;
- (4) “household spin-extractor” means an appliance in which water is removed from the textiles by centrifugal action in a rotating drum and drained through an automatic pump. This appliance is also commercially known as “spin-drier”;
- (5) “air vented tumble drier” means a tumble drier that draws in fresh air which is passed over the textiles and where the resulting moist air is exhausted into the room or vented outside;
- (6) “condenser tumble drier” means a tumble drier which includes a device (either through condensation or any other means) for removing moisture from the air used for the drying process;
- (7) “programme” means a series of operations that are pre-defined and which are declared by the supplier as suitable for drying certain types of textile;
- (8) “cycle” means a complete drying process, as defined for the selected programme;

- (9) “programme time” means the time that elapses from the initiation of the programme until the completion of the programme excluding any end-user programmed delay;
- (10) “rated capacity” means the maximum mass in kilograms stated by the supplier at 0.5 kg intervals of dry textiles of a particular type, which can be treated in a household tumble drier on the selected programme, when loaded in accordance with the supplier's instructions;
- (11) “partial load” means half of the rated capacity of a household tumble drier for a given programme;
- (12) “final moisture content” means the amount of moisture contained in the load at the end of the given programme;
- (13) “condensation efficiency” means the ratio between the mass of moisture condensed by a condenser tumble drier and the mass of moisture removed from the load by a given programme;
- (14) “off-mode” means a condition where the household tumble drier is switched off using appliance controls or switches accessible to and intended for operation by the user during normal use to attain the lowest power consumption that may persist for an indefinite time while the household tumble drier is connected to a power source and used in accordance with the supplier’s instructions; where there is no control or switch accessible to the end-user, ‘off-mode’ means the condition reached after the household tumble drier reverts to a steady-state power consumption on its own;
- (15) “left-on mode” means the lowest power consumption mode that may persist for an indefinite time after completion of the programme without any further intervention by the end-user besides unloading of the household tumble drier;
- (16) “equivalent household tumble drier” means a model of household tumble drier model placed on the market with the same rated capacity, technical and performance characteristics, energy consumption, and airborne acoustical noise emissions during drying as another model of household tumble drier placed on the market under a different commercial code number by the same supplier;
- (17) “end-user” means a consumer buying or expected to buy a household tumble drier;
- (18) “point of sale” means a location where household tumble driers are displayed or offered for sale, hire or hire-purchase.

*Article 3*  
*Responsibilities of suppliers*

Suppliers shall ensure that:

- (a) each household tumble drier is supplied with a printed label in the format and containing the information as 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 household tumble drier contains the energy efficiency class, if the advertisement discloses energy-related or price information;
- (e) any technical promotional material concerning a specific model of household tumble drier which describes its specific technical parameters includes the energy efficiency class of that model.

*Article 4*  
*Responsibilities of dealers*

Dealers shall ensure that:

- (a) each household tumble drier, at the point of sale, bears the label provided by suppliers in accordance with Article 3(a) on the outside of the front or top of the household tumble drier, in such a way as to be clearly visible;
- (b) household tumble driers offered for sale, hire or hire-purchase where the end-user cannot be expected to see the product displayed are marketed with the information provided by suppliers in accordance with Annex IV;
- (c) any advertisement for a specific model of household tumble drier contains a reference to the energy efficiency class, if the advertisement discloses energy-related or price information;
- (d) any technical promotional material concerning a specific model of household tumble drier, which describes its specific technical parameters, includes a reference to the energy efficiency class of that model.

*Article 5*  
*Measurement methods*

The information to be provided under Articles 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.

*Article 6*  
*Verification procedure for market surveillance purposes*

Member States shall apply the procedure laid down in Annex V when assessing the conformity of the declared energy efficiency class, the energy consumption per cycle, condensation efficiency class where applicable, the rated capacity, the power consumption in off-mode and left-on mode, duration of the left-on mode, programme time and airborne acoustical noise emissions.

*Article 7*  
*Revision*

The Commission shall review this Regulation in the 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.

#### *Article 8*

##### *Repeal*

Directive 95/13/EC shall be repealed from [date to be inserted: 12 months after the entry into force of this Regulation].

#### *Article 9*

##### *Transitional provisions*

1. Articles 3(d) and (e) and 4(b), (c) and (d) shall not apply to printed advertisements and printed technical promotional material published before [date to be inserted: 16 months after the entry into force of the Regulation].
2. Household tumble driers placed on the market before [date to be inserted: 12 months after the entry into force of the Regulation] shall comply with the provisions set out in Directive 95/13/EC.
3. Household tumble driers which comply with the provisions of this Regulation and which are placed on the market or offered for sale, hire or hire-purchase before [date to be inserted: 12 months after entry into force of the Regulation] shall be regarded as complying with the requirements of Directive 95/13/EC.

#### *Article 10*

##### *Entry into force*

1. This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.
2. It shall apply from [date to be inserted: 12 months after entry into force of the Regulation]. However, Article 3(d) and (e) and Article 4 (b), (c) and (d) shall apply from [date to be inserted: 16 months after the entry into force of the Regulation].

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

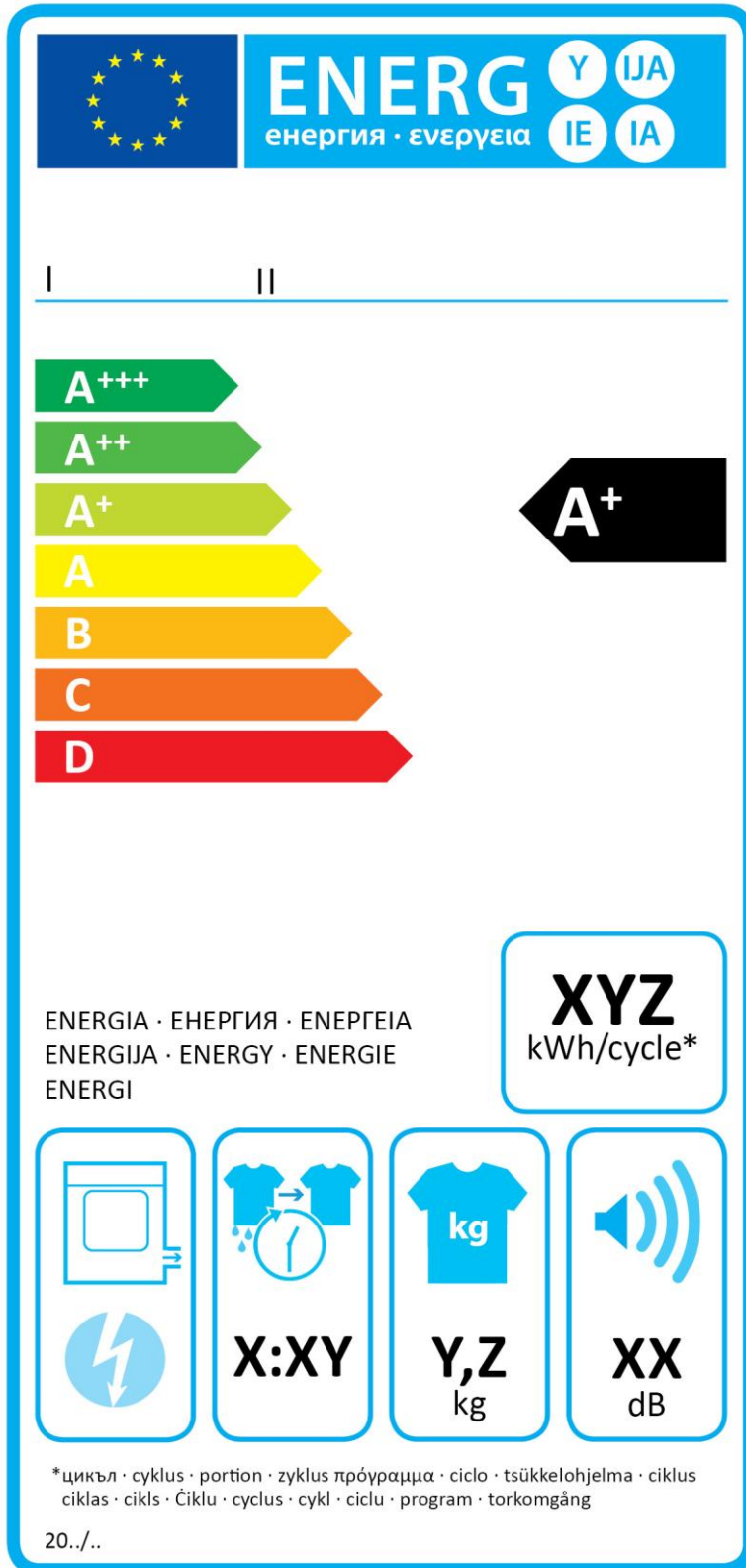
Done at Brussels, [...]

*For the Commission*

*The President*

**ANNEX I**  
**Label**

**1. LABEL FOR AIR VENTED HOUSEHOLD TUMBLE DRIERS**



I  
II

III

IV

V  
VI  
VII  
VIII

[\* Numbering of the Regulation to be added on the label before publication in the OJ]

(1) The following information shall be included in the label:

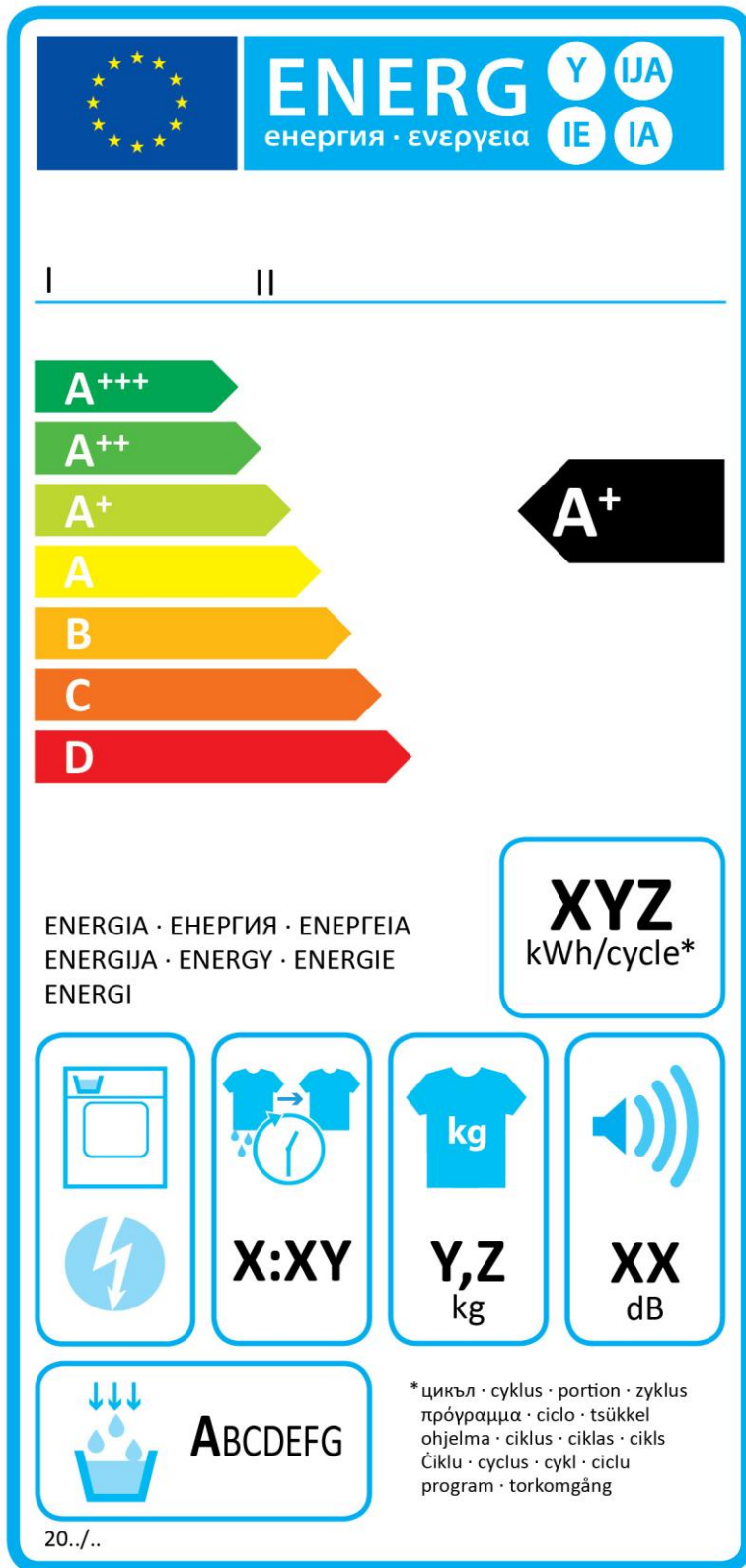
- I. supplier's name or trade mark;
- II. supplier's model identifier, meaning the code, usually alphanumeric, which distinguishes a specific household tumble drier model from other models with the same trade mark or supplier's name;
- III. the energy efficiency class as defined in point 1 of Annex VI; the head of the arrow containing the energy efficiency class of the household tumble drier shall be placed at the same height as the head of the arrow of the relevant energy efficiency class;
- IV. weighted energy consumption ( $E_C$ ) in kWh per cycle, rounded up to one decimal place in accordance with Annex VII;
- V. information on the type of household tumble driers
- VI. weighted programme time of the standard cotton programme;
- VII. rated capacity, in kg, for the standard cotton programme at full load;
- VIII. airborne acoustical noise emissions, during the drying phase, for the standard cotton programme at full load, expressed in dB(A) re 1 pW, rounded to the nearest integer.

(2) The design of the label shall be in accordance with point 4. By way of derogation, where a model has been granted an 'EU Ecolabel' under Regulation (EC) No 66/2010<sup>13</sup> of the European Parliament and of the Council, a copy of the EU Ecolabel may be added.

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<sup>13</sup> OJ L 27, 30.1.2010, p. 1–19.

2. LABEL FOR CONDENSER HOUSEHOLD TUMBLE DRIERS



I  
II

III

IV

V  
VI  
VII  
VIII

IX

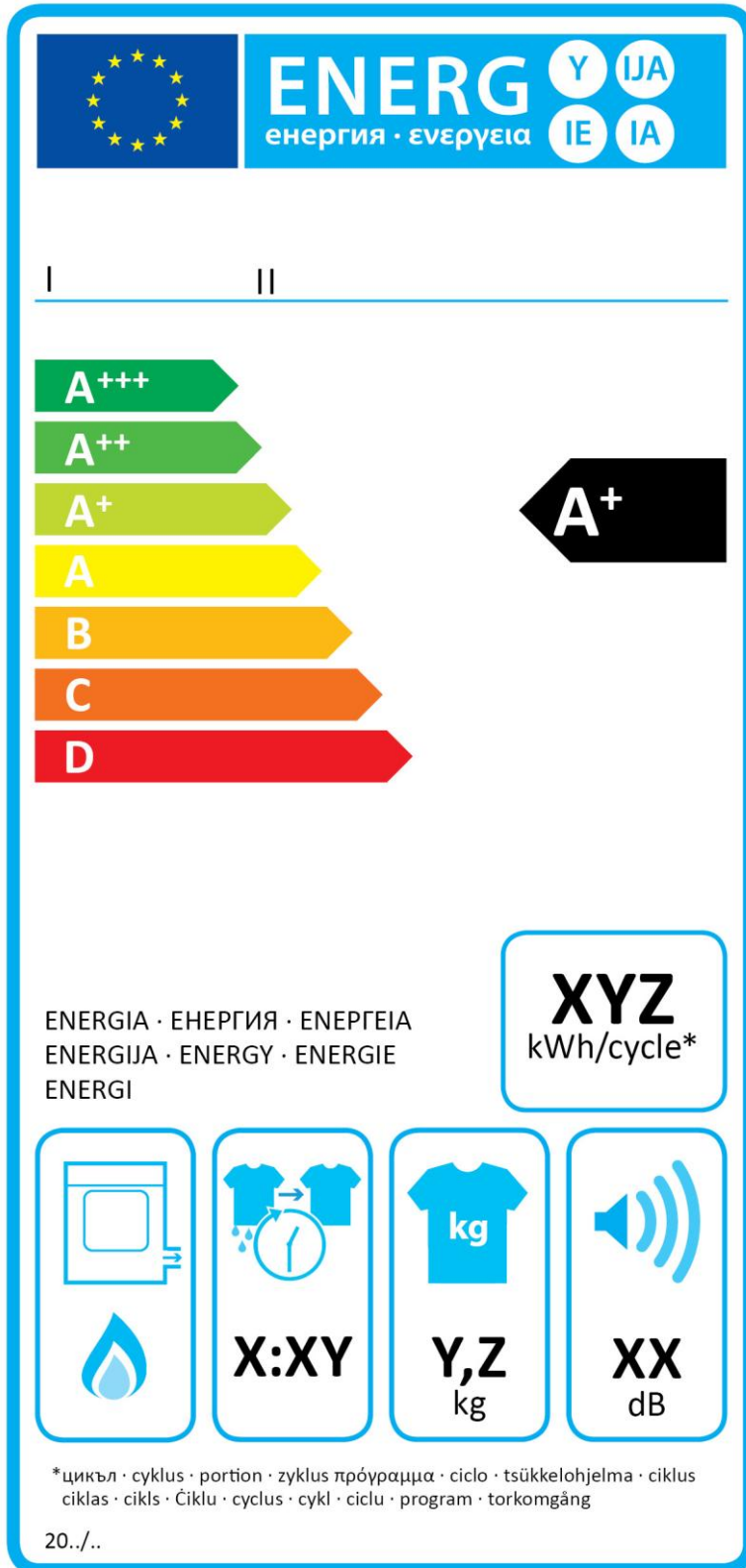
[\* Numbering of the Regulation to be added on the label before publication in the OJ]

- (1) The information listed in point 1(1) shall be included in this label in addition to:
- IX. the condensation efficiency class in accordance with point 2 of Annex VI.



(2) The design of the label shall be in accordance with point 4 of this Annex. By way of derogation, where a model has been awarded an ‘EU Ecolabel’ under Regulation (EC) No 66/2010, a copy of the EU Ecolabel may be added.

3. LABEL FOR GAS FIRED HOUSEHOLD TUMBLE DRIERS



I  
II

III

IV

V  
VI  
VII  
VIII

[\* Numbering of the Regulation to be added on the label before publication in the OJ]

- (1) The information listed in point 1(1) shall be included in this label.
- (2) The design of the label shall be in accordance with point 4 of this Annex. By way of derogation, where a model has been awarded an ‘EU Ecolabel’ under Regulation (EC) No 66/2010, a copy of the EU Ecolabel may be added.

#### **4. LABEL DESIGN**

(...)

**ANNEX II**  
**Product Fiche**

1. The information in the product fiche of the household tumble driers shall be given in the following order and shall be included in the product brochure or other literature provided with the product:
- (a) supplier's name or trade mark;
  - (b) supplier's model identifier which means the code, usually alphanumeric, which distinguishes a specific household tumble drier model from other models with the same trade mark or supplier's name;
  - (c) rated capacity in kg of cotton for the standard cotton programme at full load;
  - (d) whether the household tumble drier is an air vented, condenser or gas fired household tumble drier;
  - (e) energy efficiency class in accordance with point 1 of Annex VI;
  - (f) where the household tumble drier has been awarded an 'EU Ecolabel award' under Regulation (EC) No 66/2010 of the European Parliament and of the Council<sup>14</sup>, this information may be included;
  - (g) weighted energy consumption ( $E_C$ ) in kWh per cycle, rounded up to one decimal place; it shall be described as: 'Energy consumption 'X' kWh per cycle, based on a combination of standard cotton programmes at full and partial load and the consumption of the low-power modes. Actual energy consumption per cycle will depend on how the appliance is used.';
  - (h) the energy consumption ( $E_{dry}$ ,  $E_{dry/2}$ ,  $E_{g_{dry}}$ ,  $E_{g_{dry/2}}$ ,  $E_{g_{dr,a}}$ ,  $E_{g_{dry/2,a}}$ ) of the standard cotton programme at full and partial load;
  - (i) the power consumption of the off-mode (Po) and of the left-on mode (Pl) for the standard cotton programme at full load; and if the household tumble drier is equipped with a power management system, the duration of the 'left-on mode',
  - (j) weighted annual energy consumption ( $AE_C$ ) in kWh per year, rounded up to one decimal place; it shall be described as: 'Energy consumption 'Y' kWh per year, based on 160 standard drying cycles for dry cotton programmes at full and partial load, and the consumption of the low-power modes. Actual annual energy consumption will depend on how the appliance is used.';
  - (k) indication that the "standard cotton programme" at full and partial load is the standard drying programme to which the information in the label and the fiche relates, that this programme is suitable to dry normal wet cotton laundry and that it is the most efficient programme in terms of energy consumption for cotton;

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<sup>14</sup> OJ L 27, 30.1.2010, p. 1–19.

- (l) weighted programme time of the “standard cotton programme at full and partial load” in minutes and rounded to the nearest minute; and the programme time of the “standard cotton programme at full load” ( $T_{dry}$ ) and the programme time of the “standard cotton programme at partial load” ( $T_{dry/2}$ ), in minutes and rounded to the nearest minute;
  - (n) if the household tumble drier is a condenser tumble drier, the condensation efficiency class in accordance with point 2 Annex VI, expressed as ‘condensation efficiency class 'X' on a scale from G (least efficient) to A (most efficient)’; this may be expressed by other means provided it is clear that the scale is from G (least efficient) to A (most efficient);
  - (o) if the household tumble drier is a condenser tumble drier, the average condensation efficiency  $C_{dry}$  of the standard cotton programme at full load and the average condensation efficiency of the standard cotton programme at partial load  $C_{dry/2}$  and the weighted condensation efficiency for the “standard cotton programme at full and partial load”, in percentage and rounded to the nearest whole percent;
  - (p) airborne acoustical noise emissions expressed in dB(A) re 1 pW and rounded to the nearest integer for the standard cotton programme at full load;
  - (q) if the household tumble drier is intended to be built-in, an indication to this effect.
2. One fiche may cover a number of household tumble drier 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.

**Annex III**  
**Technical documentation**

1. The technical documentation referred to in Article 3 (c) shall include:
  - (a) the name and address of the supplier;
  - (b) a general description of the tumble drier model, sufficient for it to be unequivocally and easily identified;
  - (c) where appropriate, the references of the harmonised standards applied;
  - (d) where appropriate, the other technical standards and specifications used;
  - (e) identification and signature of the person empowered to bind the supplier;
  - (f) technical parameters for measurements as follows:
    - (i) the energy consumption ( $E_{dry}$ ,  $E_{dry\frac{1}{2}}$ ,  $E_{g_{dry}}$ ,  $E_{g_{dry\frac{1}{2}}}$ ,  $E_{g_{dr,a}}$ ,  $E_{g_{dry\frac{1}{2},a}}$ ) of the standard cotton programme at full and partial load,
    - (iii) power consumption in 'off-mode' and the power consumption in 'left-on mode',
    - (ii) the programme time of the "standard cotton programme at full load" ( $T_{dry}$ ) and the programme time of the "standard cotton programme at partial load" ( $T_{dry\frac{1}{2}}$ ), in minutes and rounded to the nearest minute,
    - (v) the programme time of the "standard cotton programme at full load" ( $T_{dry}$ ) and the programme time of the "standard cotton programme at partial load" ( $T_{dry\frac{1}{2}}$ ), in minutes and rounded to the nearest minute,
    - (v) if the household tumble drier is equipped with a power management system, the duration of the 'left-on mode',
    - (vi) if the household tumble drier is a condenser tumble drier, the average condensation efficiency  $C_{dry}$  of the standard cotton programme at full load and the average condensation efficiency of the standard cotton programme at partial load  $C_{dry\frac{1}{2}}$ ,
    - (vii) the airborne acoustical noise emissions;
  - (g) the results of calculations performed in accordance with Annex VII.
2. Where the information included in the technical documentation file for a particular household tumble drier model has been obtained by calculation on the basis of design, or extrapolation from other equivalent household tumble drier 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 household tumble drier models where the information was obtained on the same basis.

#### ANNEX IV

#### Information to be provided in the cases where end-users cannot be expected to see the product displayed

1. The information referred to in Article 4(b) shall be provided in the following order:
  - (a) the rated capacity in kg of cotton, for the standard cotton programme at full load;
  - (b) whether the household tumble drier is an air vented, condenser or gas fired household tumble drier;
  - (c) the energy efficiency class as defined in point 1 of Annex VI;
  - (d) the weighted energy consumption ( $E_C$ ) in kWh per cycle, rounded up to one decimal place and calculated in accordance with Annex VII;
  - (e) the power consumption of the off-mode and of the left-on mode for the standard cotton programme at full load;
  - (f) the weighted programme time of the “standard cotton programme at full and partial load” in minutes and rounded to the nearest minute, calculated in accordance with Annex VII;
  - (g) if the household tumble drier is a condenser tumble drier, the condensation efficiency class in accordance with point 2 of Annex VI;
  - (h) airborne acoustical noise emissions for the standard cotton programme at full load, expressed in dB(A) re 1 pW and rounded to the nearest integer;
  - (i) if the household tumble drier is intended to be built-in, an indication to this effect.
2. Where other information contained in the product fiche is also provided, it shall be in the form and order specified in Annex II.
3. The size and font, in which all the information referred in this Annex is printed or shown, shall be legible.

## ANNEX V

### Verification procedure for market surveillance purposes

For the purposes of checking conformity with the requirements laid down in Articles 3 and 4, Member State authorities shall test a single household tumble drier. If the measured parameters do not meet the values declared by the supplier within the ranges set out in Table 1, the measurements shall be carried out on three more household tumble driers. The arithmetic mean of the measured values of these three household tumble driers shall meet the values declared by the supplier within the range defined in Table 1.

Otherwise, the model and all other equivalent household tumble driers models shall be considered not to comply with the requirements laid down in Articles 3 and 4.

Member States authorities shall use reliable, accurate and reproducible measurement procedures, which take into account the generally recognised state-of-the-art measurement methods, including methods set out in documents the reference numbers of which have been published for that purpose in the Official Journal of the European Union.

**Table 1**

Measured parameter	Verification tolerances
Weighted annual energy consumption	The measured value shall not be greater than the rated value* of $AE_C$ by more than 10 %.
Weighted energy consumption	The measured value shall not be greater than the rated value of $E_t$ by more than 10 %.
Weighted condensation efficiency	The measured value shall not be less than the rated value of $C_t$ by more than 10 %.
Weighted programme time	The measured value shall not be longer than the rated values of $T_t$ by more than 10 %.
Power consumption in off-mode and left-on mode	The measured value of power consumption $P_o$ and $P_l$ of more than 1,00 W shall not be greater than the rated value by more than 10 %. The measured value of power consumption $P_o$ and $P_l$ of less than or equal to 1,00 W shall not be greater than the rated value by more than 0,10 W .
Duration of the left-on mode	The measured value shall not be longer than the rated value of $T_{lu}$ by more than 10 %.
Airborne acoustical noise emissions	The measured value shall meet the rated value.

\* “rated value” means a value that is declared by the supplier

## **ANNEX VI**

### **Energy efficiency classes and condensation efficiency classes**

#### **1. ENERGY EFFICIENCY CLASSES**

The energy efficiency class of a household tumble drier shall be determined in accordance with its Energy Efficiency Index (*EEI*) as set out in Table 1.

The Energy Efficiency Index (*EEI*) of a household tumble drier shall be determined in accordance with point 1 of Annex VII.

**Table 1: Energy efficiency classes**

<b>Energy efficiency class</b>	<b>Energy Efficiency Index</b>
A+++ (most efficient)	$EEI < 35$
A++	$35 \leq EEI < 43$
A+	$43 \leq EEI < 53$
A	$53 \leq EEI < 65$
B	$65 \leq EEI < 76$
C	$76 \leq EEI < 85$
D (least efficient)	$85 \leq EEI$

#### **2. CONDENSATION EFFICIENCY CLASSES**

The condensation efficiency class of a household condenser tumble drier shall be determined in accordance with the weighted condensation efficiency ( $C_t$ ) as set out in Table 2.

The weighted condensation efficiency ( $C_t$ ) of a household condenser tumble drier shall be determined in accordance with point 3 of Annex VII.

**Table 2: Condensation efficiency classes**

<b>Condensation efficiency class</b>	<b>Weighted condensation efficiency</b>
A (most efficient)	$C_t > 90$
B	$80 < C_t \leq 90$
C	$70 < C_t \leq 80$
D	$60 < C_t \leq 70$
E	$50 < C_t \leq 60$
F	$40 < C_t \leq 50$
G (least efficient)	$C_t \leq 40$



## ANNEX VII

### Method for calculating the Energy Efficiency Index, weighted energy consumption per cycle and weighted condensation efficiency

#### 1. CALCULATION OF THE ENERGY EFFICIENCY INDEX

For the calculation of the Energy Efficiency Index (*EEI*) of a household tumble drier model, the weighted Annual Energy Consumption of a household tumble drier for the standard cotton programme at full and partial load is compared to its Standard Annual Energy Consumption.

- (a) The Energy Efficiency Index (*EEI*) is calculated as follows and rounded to one decimal place:

$$EEI = \frac{AE_C}{SAE_C} \times 100$$

where:

- $AE_C$  = weighted Annual Energy Consumption of the household tumble drier;
- $SAE_C$  = standard Annual Energy Consumption of the household tumble drier.

- (b) The Standard Annual Energy Consumption ( $SAE_C$ ) is calculated in kWh/year as follows and rounded to one decimal place:

- for all household tumble driers that are not air vented:

$$SAE_C = 70,9 \times c + 168,9$$

- for household air vented tumble driers:

$$SAE_C = 70,9 \times c + 168,9 - \left( 30 \times \frac{T_t}{60} \right)$$

where:

- $c$  is the rated capacity of the household tumble drier for the standard cotton programme;
- $T_t$  is the weighted programme time for the standard cotton programmes.

- (c) The weighted Annual Energy Consumption ( $AE_C$ ) is calculated in kWh/year as follows and is rounded to one decimal place:

$$(i) \quad AE_C = E_t \times 160 + \frac{\left[ P_o \times \frac{525600 - (T_t \times 160)}{2} + P_l \times \frac{525600 - (T_t \times 160)}{2} \right]}{60 \times 1000}$$

where:

- $E_t$  = weighted energy consumption;
- $P_o$  = power in 'off-mode' for the standard cotton programme at full load;

- $P_l$  = power in 'left-on mode' for the standard cotton programme at full load;
- $T_l$  = weighted programme time;
- 160 = total number of standard drying cycles per year.

- (ii) When the household tumble drier is equipped with a power management system, with the household tumble drier reverting automatically to 'off-mode' after the end of the programme, the weighted Annual Energy Consumption ( $AE_C$ ) is calculated taking into consideration the effective duration of the 'left-on mode', according to the following formula:

$$AE_C = E_t \times 160 + \frac{(P_l \times T_l \times 160) + P_o \times [25600 - (T_l \times 160) - (T_l \times 160)]}{60 \times 1000}$$

where:

$T_l$  = duration of the 'left-on mode' for the standard cotton programme at full load, in minutes and rounded to the nearest minute.

- (d) The weighted programme time ( $T_t$ ) for the standard cotton programmes is calculated in minutes as follows and rounded to the nearest minute:

$$T_t = (3 \times T_{dry} + 4 \times T_{dry^{1/2}}) / 7$$

where:

- $T_{dry}$  = programme time for the standard cotton programme at full load;
- $T_{dry^{1/2}}$  = programme time for the standard cotton programme at partial load.

- (e) The weighted energy consumption ( $E_t$ ) is calculated in kWh as follows and rounded to two decimal places:

$$E_t = (3 \times E_{dry} + 4 \times E_{dry^{1/2}}) / 7$$

where:

- $E_{dry}$  = energy consumption of the standard cotton programme at full load;
- $E_{dry^{1/2}}$  = energy consumption of the standard cotton programme at partial load.

- (f) For gas fired household tumble driers, the energy consumption for the standard cotton programme at full and partial load are calculated in kWh, rounded to two decimal places as:

$$E_{dry} = \frac{Eg_{dry}}{f_g} + Eg_{dry,a}$$

$$E_{dry^{1/2}} = \frac{Eg_{dry^{1/2}}}{f_g} + Eg_{dry^{1/2},a}$$

where:

- $E_{g_{dry}}$  = gas consumption of the standard cotton programme at full load, in kWh
- $E_{g_{dry^{1/2}}}$  = gas consumption of the standard cotton programme at partial load, in kWh;
- $E_{g_{dry,a}}$  = auxiliary electricity consumption of the standard cotton programme at full load;
- $E_{g_{dry^{1/2},a}}$  = auxiliary electricity consumption of the standard cotton programme at partial load;
- $f_g = 2.5$ .

## 2. CALCULATION OF THE WEIGHTED ENERGY CONSUMPTION PER CYCLE

- (a) The average energy consumption per cycle ( $E_C$ ) is calculated in kWh as follows and rounded to one decimal place:

$$E_C = \frac{AE_C}{160}$$

## 3. CALCULATION OF THE WEIGHTED CONDENSATION EFFICIENCY

The weighted condensation efficiency of a programme is the ratio between the mass of moisture condensed and collected in the container of a condenser tumble drier and the mass of moisture removed from the load by the drying programme, the latter being the difference between the mass of the wet load before drying and the mass of the test load after drying. For the calculation of the condensation efficiency the weighted condensation efficiency for the standard cotton programme at full and partial load is considered.

The weighted condensation efficiency ( $C_t$ ) of a programme is calculated in percentage and rounded to the nearest whole percent as:

$$C_t = (3 \times C_{dry} + 4 \times C_{dry^{1/2}}) / 7$$

Where:

- $C_{dry}$  = average condensation efficiency of the standard cotton programme at full load;
- $C_{dry^{1/2}}$  = average condensation efficiency of the standard cotton programme at partial load.

The average condensation efficiency  $C$  is calculated from the condensation efficiencies of test runs and expressed as a percentage:

$$C = \frac{1}{n} \sum_{j=2}^n \left( \frac{W_{w_j}}{W_i - W_f} \times 100 \right)$$

Where:

- $n$  is the number of test runs;
- $j$  is the test run number, at least four valid test runs for the selected programme; excluding the first test run shall be used;

- $W_{wj}$  is the mass of water collected in the condenser reservoir during test run  $j$ ;
- $W_i$  is the mass of the wet test load before drying;
- $W_f$  is the mass of the test load after drying.