

# Topten ACT Criteria Paper

## Tumble driers

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**Topten ACT** aims at transforming the European market of energy-using products towards higher energy efficiency.

Topten ACT identifies the top energy-efficient products in 16 European countries, and makes this information available to consumers and large buyers on tailored national websites. The most energy efficient models in different product categories (such as household appliances, lighting, office equipment, consumer electronics, cars) are presented with comprehensive product information based on official labels and standardized declarations. Topten works with manufacturers and thus increases both market offer and consumer demand of high energy efficiency products. Topten is strictly neutral and independent from manufacturers and retailers, its selection criteria are always published online.

Topten ACT is supported by the European Commission's research and innovation programme Horizon 2020, and many national organisations (energy agencies, environmental and consumer organisations, research institutes). The Topten ACT project involves 17 partners in 16 European countries. It is coordinated by ADEME (Agence de l'Environnement et de la Maîtrise de l'Energie).

More information and access to all national websites on the European site: [www.topten.eu](http://www.topten.eu)

WP2 European Product Analysis , Task 2.1 Determining energy efficiency criteria, D 2.1 Periodic Criteria Papers (first set)

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## 1. Topten.eu: tumble driers current selection criteria and products selected

Topten.eu selection criteria:

	Residential driers	Semi-professional driers	Professional driers
Energy efficiency	Class A++	Class A++	< 0.3 kWh/kg
Condensation efficiency	Class B	Class A	

Semi-professional driers are a Swiss specialty: these are used in common laundry rooms in multi-apartment buildings. They are constructed more robust for high-intensity usage. For professional driers there is no Energy Label. As for residential driers, Topten.eu lists only professional driers with heat pump – to date only these reach efficiency levels < 0.3 kWh/kg.

Number of tumble driers currently on Topten.eu according to capacity (last update: June 2015):

### Residential driers

Energy / condensation efficiency	7kg	8kg	9kg	Total
A+++/A	2	6	1	9
A+++/B	-	2	-	2
A++/A	4	9	7	20
A++/B	8	9	2	19
Total	14	26	10	50

### Semi-professional driers

A+++/A	-
A+++/B	-
A++/A	5
A++/B	-
Total	5

### Professional driers: 8

Similar models have not been counted if from the same brand.

There are 63 tumble drier models of 14 different brands on the Topten.eu product list: AEG, Bauknecht, BEKO, Blomberg, Bosch, Electrolux, Gorenje, Haier, LG, Miele, Samsung, Schulthess, Siemens and V-ZUG.

## 2. Expected selection criteria in 2016

Topten.eu selection criteria expected for 2016:

	Residential driers	Semi-professional driers
Energy efficiency	class A+++	class A+++
Condensation efficiency class	class A	class A

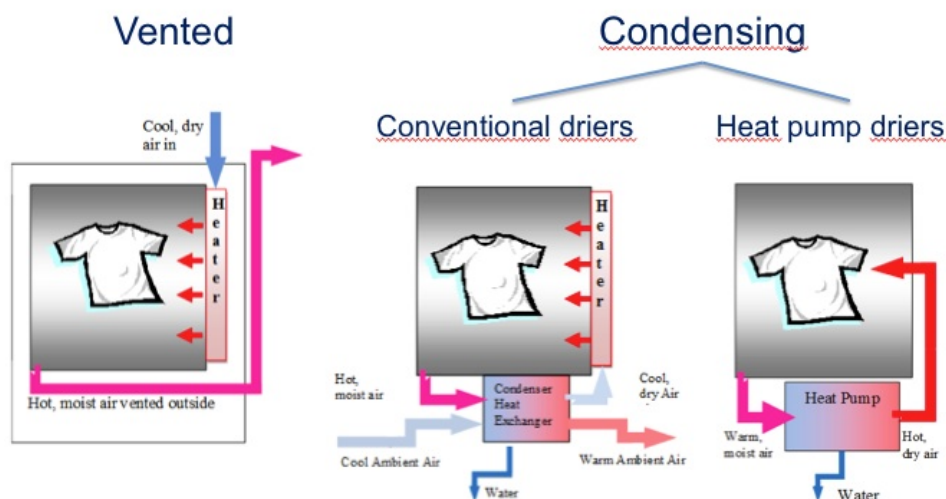
### 3. Technical background

Tumble driers evaporate the moisture by blowing hot dry air through wet laundry. The air is typically heated by an electric resistance heating element. European driers use one of two different technologies to remove the evaporated water:

- Vented driers (open systems) blow the moist exhaust air (drawn from the building interior) outdoors, which can cause unwanted smells, steam and noise at the external vent.
- Condensing driers (closed systems) use a heat exchanger cooled by interior air to condense water from the warm moist air in the drier.

Heat pump driers are usually condensing driers which also integrate a heat pump. Warm, damp air flows out of the laundry drum into the evaporator, where the air is dehumidified and the warm air returned to the drum.

Heat pump driers consume only about half of the electricity of conventional condensing driers. This makes them a highly efficient alternative to conventional systems. However, within the group of heat pump driers the energy efficiency varies quite considerably. Due to lower operating temperatures heat pump driers also cause less damage to clothing than other types of driers but increase drying times. (source: Bush, 2015)



Source: Super Efficient Dryer Initiative SEDI

Fig.: Tumbler technologies

A good condensation efficiency is also important, because if too much humidity is expelled into the room instead of condensed and collected, building damages can be caused. In order to avoid these, an air dehumidifier might be needed – leading to additional electricity consumption.

### 4. Policy measures, standards and labels

The Ecodesign requirements and Energy Label from 2012, currently in force, are expected to lead to 9.5 TWh of savings in 2030. Both regulations are due for review in 2017.

#### Energy Label

The current energy Label for tumble driers (regulation No. 392/2012) with classes up to A+++ applies since June 2013. Classes A and better are to date only reached by tumble driers with integrated heat pump. Nearly all of them are even in classes A+ to A+++ - only few, relatively inefficient heat pump driers are in class A.



The classification scale is based on the Energy Efficiency Index (EEI). The EEI is the relation of a model's annual energy consumption to a reference model's (of the same capacity) energy consumption (in %). The EEI calculation formula assumes 160 drying cycles per year (around three per week), of which 4 out of seven are assumed to be operated with a half load filling. Left-On and Off mode power consumption is also included. For vented driers, the standard energy consumption (the reference) is reduced by a factor depending on programme time. For gas driers, a primary energy conversion factor of 2.5 is included in the formula.

Energy Label		Ecodesign requirements
Class	EEI	
A+++	$EEI < 24$	
A++	32	
A+	42	
A	65	
B	76	
C	85	Banned from Nov 2015
D	$85 \leq EEI$	Banned since Nov 2013

The condensation efficiency indicates the percentage of humidity that is condensed and collected. The rest (10% for class A) is expelled to the room.

Condensation efficiency class	Weighted condensation efficiency	Ecodesign requirements
A	$C > 90$	
B	80	
C	70	
D	60	Banned from Nov 2015
E	50	Banned since Nov 2013
F	40	
G	$C < 40$	

Apart from energy and condensation efficiency, the Label also indicates the annual energy consumption (assuming 160 drying cycles per year), cycle time of the full load cotton programme, capacity (kg), sound power level (dB) and whether the model is an electric or gas drier.

In the Label Fiche, manufacturers must additionally declare the power consumption of the left-on and off mode, the duration of the left-on mode, and for the standard cotton programme at full and half load: the energy consumption per cycle, the programme time, and the condensation efficiency.

### Ecodesign requirements

Tier 1 of the Ecodesign regulation for tumble driers No 932/2012 applies since 1<sup>st</sup> November 2013: tumble driers must reach at least energy efficiency class C and condensation efficiency class D. This means that the worst performing driers are banned from the market.

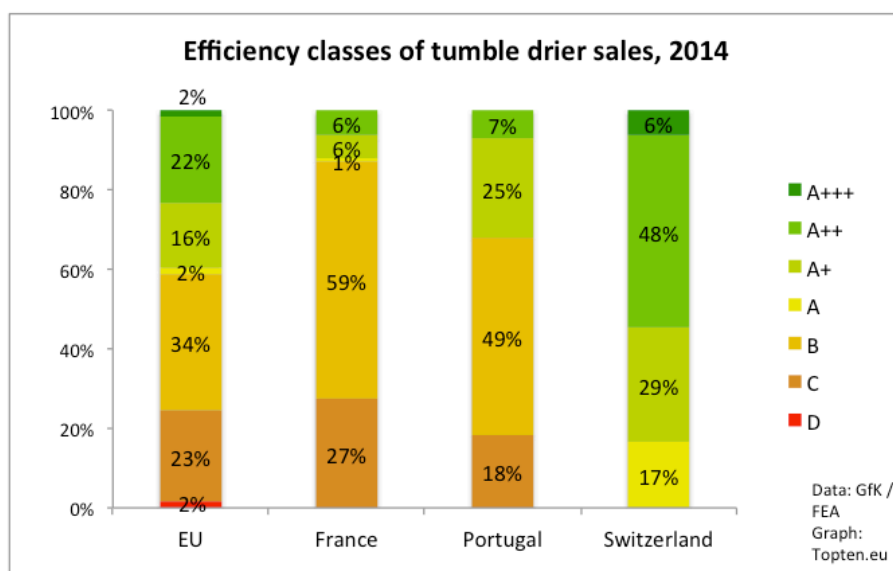
In November 2015 the requirements will be made more ambitious, and drier models must reach the energy efficiency class B and condensation efficiency class C (see table 3).

Ecodesign requirements for driers		Minimum energy efficiency		Min. condensation efficiency
		New EEI	Class	
Tier 1	Nov. 2013	< 85	C	60%
Tier 2	Nov. 2015	< 76	B	70%

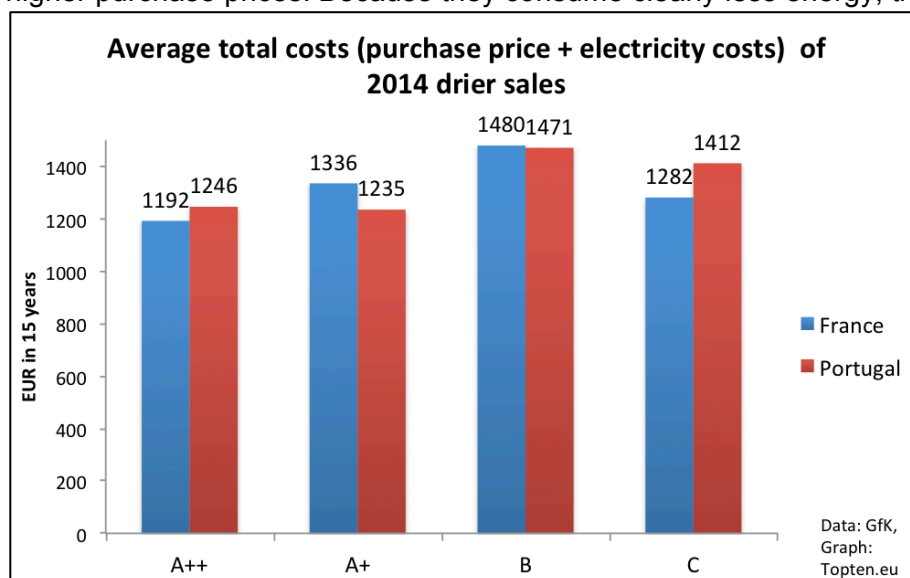
In the last few years vented driers have been improved, so that they can meet class B and are not banned by tier 2.

#### 4.1. Market analysis

The Topten market monitoring report from June 2015 showed that in 2014 nearly 3.9 million tumble driers were sold across the EU. Already 42% were heat pump driers, in classes A and better – but differences between countries are large.



In Switzerland, only heat pump driers are allowed on the market since 2012. Since 2015, driers must meet A+ efficiency in Switzerland. Data from France and Portugal shows that energy efficient driers are cost effective, despite higher purchase prices. Because they consume clearly less energy, the total costs are lower.



More results from the EU, France and Portugal are available in the report:  
[http://www.topten.eu/uploads/File/WhiteGoods\\_in\\_Europe\\_June15.pdf](http://www.topten.eu/uploads/File/WhiteGoods_in_Europe_June15.pdf)

## 5. FAQ

*What is the most energy efficient method to dry the laundry?*

The most efficient way to dry the laundry is clearly to hang it outside and have it dried by sun and wind. If space and weather allow, this is clearly the option to choose.

*Do programmes of heat pump driers last longer?*

No, not in general. There are many heat pump driers with pretty short programme times, and they can be faster than many conventional driers. On Topten.eu there are 15 models with programme times shorter than 150 minutes. The fastest model with heat pump dries the laundry in the standard programme in 91 minutes.

## 6. References and links

### Useful links

Topten.eu tumble driers product lists:

<http://www.topten.eu/english/household/dryers/residential-use-7kg.html>  
<http://www.topten.eu/english/household/dryers/residential-use-8kg.html>  
<http://www.topten.eu/english/household/dryers/residential-use-9kg.html>  
[http://www.topten.eu/english/household/dryers/more\\_families.html](http://www.topten.eu/english/household/dryers/more_families.html)  
<http://www.topten.eu/english/household/dryers/professional-use.html>

Topten.eu tumble driers selection criteria:

[http://www.topten.eu/english/criteria/tumble\\_dryers.html&fromid=](http://www.topten.eu/english/criteria/tumble_dryers.html&fromid=)

Topten policy recommendations (from January 2014):

[http://www.topten.eu/uploads/File/Recommendations\\_driers\\_Jan\\_2014.pdf](http://www.topten.eu/uploads/File/Recommendations_driers_Jan_2014.pdf)

### References

Energy Label for driers, regulation No. 392/2012, and corrigendum:

<http://www.topten.eu/uploads/File/Energy%20Label%20Driers%20March%202012.pdf>

<http://www.topten.eu/uploads/File/Corrigendum%20Energy%20Label%20Driers%20May%202012.pdf>

Ecodesign regulation No. 932/2012 for tumble driers:

[http://www.topten.eu/uploads/File/Ecodesign\\_regu\\_932\\_2012\\_driers.pdf](http://www.topten.eu/uploads/File/Ecodesign_regu_932_2012_driers.pdf)

Eric Bush et al.: Heat pump tumble driers: market development in Europe and MEPS in Switzerland. Presented at EEDAL in Lucerne, August 2015.

[http://www.topten.eu/uploads/File/EEDAL15\\_Eric\\_Bush\\_Heat\\_Pump\\_Tumble\\_Driers.pdf](http://www.topten.eu/uploads/File/EEDAL15_Eric_Bush_Heat_Pump_Tumble_Driers.pdf)

Topten: Energy efficiency of white goods in Europe: monitoring the market with sales data. June 2015. [http://www.topten.eu/uploads/File/WhiteGoods\\_in\\_Europe\\_June15.pdf](http://www.topten.eu/uploads/File/WhiteGoods_in_Europe_June15.pdf)