

# Rounding rules for energy labelled products

It is important to round numbers correctly when calculating the basis of the energy class of a product. If a product is close to the threshold between two energy classes, incorrect rounding may result in the wrong energy class.

When market surveillance reveals incorrect rounding in random tests, the energy class must be recalculated. Correct rounding therefore results in less work for producers and importers who are responsible for producing the technical documentation.

The person or organization that produces the technical documentation for a product is responsible for rounding correctly. The producer is responsible if the company is located in the EU, or has an official representative in the EU. The importer is responsible if there is no producer, or there is no official representative of the producer, in the EU.

**This memorandum provides details of the rounding rules for the following products:**

- ▲ Fridges and freezers
- ▲ Washing machines
- ▲ Dishwashers
- ▲ Tumble driers
- ▲ Air conditioners
- ▲ Vacuum cleaners
- ▲ Ovens
- ▲ Range hoods
- ▲ Televisions
- ▲ Professional refrigerated storage cabinets
- ▲ Ventilation units
- ▲ Space heaters, combination heater
- ▲ Water heaters

## Why is rounding important?

The energy class of a product is obtained through various calculations with different rounding rules. Sometimes, rounding to the nearest whole integer applies; on other occasions, rounding to one, two or three decimal places applies.

## Example

A fridge with an energy efficiency rating that is on the threshold between energy class A++ ( $22 \leq \text{EEI} < 33$ ) and A+ ( $33 \leq \text{EEI} < 44$ ) is wrongly classified if the supplier rounds incorrectly as follows:

The supplier assumes that the fridge has an equivalent volume ( $V_{\text{eq}}$ ) of 373.08 which results in a standard annual consumption of electricity for a standard product ( $\text{SAE}_c$ ) of 592.88 kWh and an energy efficiency index (EEI) of 32.9 (equivalent to A++).

If  $V_{\text{eq}}$  is rounded correctly, the resulting equivalent volume is 373. This results in a standard annual consumption of electricity for a standard product ( $\text{SAE}_c$ ) of 592.82 kWh and an energy efficiency index (EEI) of 33 (equivalent to A+).

## List of rounding rules

The following pages list the rounding rules for the values that must be shown on the energy label of the product, as well as a range of other values that are taken into account when calculating the energy efficiency class of a product. The rounding rules are clearly described in the energy labelling regulations for the product.

In addition to the rules in this document it is important to follow the rules in the relevant measurement standards. For example, the measurement standards may have requirements specifying how to provide the measurement result in terms of the number of significant digits or decimals. Correctly rounded measurement result must be provided in the technical documentation.

#### Explanation to the table:

“No rule” means that the actual parameter must be reported, but there is no rounding rule for the parameter set in the regulation. “Not required” means that no value should be reported.

### Refrigerating products

Parameter	Symbol	Technical documentation		Energy label and fiche	
		Rounding		Rounding	
Equivalent volume of the household refrigerating appliance	$V_{eq}$	Nearest integer	xx	Not required	
Standard annual energy consumption of the household refrigerating appliance	$SAE_C$	Two decimals	xx,xx	Not required	
Annual energy consumption of the household refrigerating appliance	$AE_C$	Two decimals	xx,xx	Up to nearest integer *	xx
Energy consumption of the household refrigerating appliance in kWh/24h	$E_{24h}$	Three decimals	xx,xxx	Not required	
Energy Efficiency Index	EEI	One decimal	xx,x	Not required	
Noise emission, dB		No rule		Nearest integer	xx

\* For example 119,1 is rounded to 120.

### Washing machines

Parameter	Symbol	Technical documentation		Energy label and fiche	
		Rounding		Rounding	
Standard annual energy consumption of the household washing machine	$SAE_C$	Two decimals	xx,xx	Not required	
Annual energy consumption of the household washing machine	$AE_C$	Two decimals	xx,xx	Up to nearest integer	xx
Rated capacity of the household washing machine for the standard 60 °C cotton programme at full load or the standard 40 °C cotton programme at full load, whichever is the lower.	c	Not required		Up to one decimal	xx.x
Weighted energy consumption	$E_t$	Three decimals	xx,xxx	No rule	
Weighted power in 'off-mode'	$P_o$	Two decimals*	xx,xx	Not required	
Weighted power in the 'left-on mode'	$P_l$	Two decimals*	xx,xx	Not required	
Weighted programme time	$T_t$	Nearest integer	xx	Not required	
Programme time of the standard 60 °C cotton programme at full and partial load and for 40 °C cotton programme at partial load	$T_{t,60}$ $T_{t,60\frac{1}{2}}$ $T_{t,40\frac{1}{2}}$	Not required		Nearest integer	xx

Time in 'left-on mode'	T <sub>l</sub>	Up to nearest integer	xx	No rule	
Weighted annual water consumption	AW <sub>C</sub>	Up to nearest integer	xx	Up to nearest integer *	xx
Weighted water consumption	W <sub>t</sub>	Nearest integer	xx	No rule	
Weighted remaining moisture content	D	Nearest integer	xx	No rule	
Residual moisture content for the standard 60 °C cotton programme at full and partial load and the standard 40 °C cotton programme at partial load.	D <sub>60</sub> D <sub>60½</sub> D <sub>40½</sub>	Nearest integer	xx	No rule	
Energy Efficiency Index	EEl	One decimal	xx,x	No rule	
Noise emission, dB	-	No rule		Nearest integer	xx

\*Rounding rules are from measure standard for measuring low energy consumption DS/EN 50564: 2011

### Household Dishwashers

Parameter	Symbol	Technical documentation		Energy label and fiche	
		Rounding		Rounding	
Standard annual energy consumption of the household dishwasher	SAE <sub>C</sub>	Two decimals	xx,xx	No rule	
Annual energy consumption of the household dishwasher	AE <sub>C</sub>	Two decimals	xx,xx	Up to nearest integer	xx
Energy consumption for the standard cycle, in kWh	E <sub>t</sub>	Three decimals	x,xxx	No rule	
Power in 'off-mode' for the standard cleaning cycle, in W	P <sub>o</sub>	Two decimals*	xx,xx	No rule	
Power in 'left-on mode' for the standard cleaning cycle, in W	P <sub>t</sub>	Two decimals*	x,xx	No rule	
Programme time for the standard cleaning cycle, in minutes	T <sub>t</sub>	Nearest integer	xx	No rule	
Measured time in 'left-on mode' for the standard cleaning cycle, in minutes	T <sub>l</sub>	Nearest integer	xx	No rule	
Drying Efficiency Index	I <sub>D</sub>	Two decimals	xx,xx	No rule	
Annual water consumption	AW <sub>C</sub>	Up to nearest integer	xx	Up to nearest integer	xx
Water consumption for the standard cleaning cycle, in litres	W <sub>t</sub>	One decimal	xx,x	No rule	
Energy Efficiency Index	EEl	One decimal	xx,x	No rule	
Noise emission, dB	-	Nearest integer	xx	Nearest integer	xx

\*Rounding rules are from measure standard for measuring low energy consumption DS/EN 50564: 2011

## Tumble Driers

Parameter	Symbol	Technical documentation		Energy label and fiche	
		Rounding		Rounding	
Standard annual energy consumption of the household tumble drier	SAE <sub>C</sub>	Two decimals	xx,xx	No rule	
Weighted annual energy consumption of the household tumble drier	AE <sub>C</sub> AE <sub>C(Gas)</sub> AE <sub>C(Gas)el</sub>	Two decimals	xx,xx	Energy label: Up to nearest integer  Fiche: Up to one decimal	xx,x
Rated capacity of the household tumble drier	c	Not required		Up to one decimal	xx,x
Weighted energy consumption, in kWh	E <sub>t</sub>	Two decimals	xx,xx	No rule	
Power in 'off-mode' for the standard cotton programme at full load, in W	P <sub>o</sub>	Two decimals*	x,xx	No rule	
Power in 'left-on mode' for the standard cotton programme at full load, in W	P <sub>l</sub>	Two decimals*	x,xx	No rule	
Weighted programme time, in minutes	T <sub>t</sub>	Nearest integer	xx	Nearest integer	xx
Duration of the 'left-on mode' for the standard cotton programme at full load, in minutes	T <sub>l</sub>	Nearest integer	xx	No rule	
Programme time for the standard cotton programme at full load, in minutes	T <sub>dry</sub> T <sub>dry½</sub>	Nearest integer	xx	Nearest integer	xx
Energy consumption of the standard cotton programme at full load, in kWh	E <sub>dry</sub> E <sub>dry½</sub>	Two decimals	xx,xx	No rule	
Gas consumption of the standard cotton programme at full and partial load, in kWh	E <sub>gdry</sub> E <sub>gdry½</sub>	Two decimals	xx,xx	No rule	
Auxiliary electricity consumption of the standard cotton programme in full and partial load, in kWh	E <sub>gdry,a</sub> E <sub>gdry½,a</sub>	Two decimals	xx,xx	No rule	
Weighted condensation efficiency	C <sub>t</sub>	Nearest integer	xx	Nearest integer	xx
Energy Efficiency Index	EEL	One decimal	xx,x	No rule	
Airborne acoustical noise emissions	L <sub>WA</sub>	No rule		Nearest integer	xx

\*Rounding rules are from measure standard for measuring low energy consumption DS/EN 50564: 2011

## Air conditioners

Parameter	Symbol	Technical documentation		Energy label and fiche	
		Rounding		Rounding	
Annual electricity consumption for cooling and heating	Q <sub>CE</sub> Q <sub>HE</sub>	Not required		Up to nearest integer	xx
Coefficient of performance and energy efficiency ratio	COP EER	Three significant figures*	x,xx	Up to one decimal	x,x

Seasonal coefficient of performance og seasonal energy efficiency ratio	SCOP SEER	Not required		Up to one decimal	x,x
Design load for cooling and heating	$P_{designc}$ $P_{designh}$	Two decimals*	xx,xx	Up to one decimal	xx,x
Noise emission, dB		Nearest integer	xx	Nearest integer	xx

\*Rounding rules are from measure standard for measuring low energy consumption DS/EN 50564: 2011

## Vacuum cleaners

Parameter	Symbol	Technical documentation		Energy label and fiche	
		Rounding		Rounding	
Annual energy consumption (carpets, hard floors, and general purpose)	$AE_c$ , $AE_{hf}$ , $AE_{gp}$	One decimal	xx,x	Prodcut fiche: One decimal Energy label: Up to nearest integer	xx,x
Sound power level	-	Nearest integer	xx	Nearest integer	xx
Dust pick-up on carpet	$dpu_c$	Three decimals	xx,xxx	Not required	
Dust pick-up on hard floor	$dpu_{hf}$	Three decimals	xx,xxx	Not required	
Measured dust pick-up of the vacuum cleaner	$dpu_m$	Three decimals	xx,xxx	Not required	
Dust pick-up of the reference vacuum cleaner system measured when the test carpet was in original condition	$dpu_{cal}$	Three decimals	xx,xxx	Not required	
Measured dust pick-up of the reference vacuum cleaner	$dpu_{ref}$	Three decimals	xx,xxx	Not required	
Dust re-emission	$dre$	Two decimals	xx,xx	Not required	
Rated input power		No rule	xx	No rule	
Average specific energy consumption during carpet test	$ASE_c$	Three decimals	xx,xxx	Not required	
Average specific energy consumption during hard floor test	$ASE_{hf}$	Three decimals	xx,xxx	Not required	
Average specific energy consumption	SE	Three decimals	xx,xxx	Not required	
Average power	P	Two decimals	xx,xx	Not required	
Power equivalent of battery operated active nozzles	NP	Two decimals	xx,xx	Not required	
Total time in a cleaning cycle	t	Four decimals	xx,xxxx	Not required	
Surface area passed over by the cleaning head in a cleaning cycle	A	Three decimals	xx,xxx	Not required	
Cleaning head width		Three decimals	xx,xxx	Not required	

Electricity consumption of the battery operated active nozzle of the vacuum cleaner necessary to fully charge the battery after a cleaning cycle	E	Three decimals	xx,xxx	Not required	
Total time in a cleaning cycle, in which the battery operated active nozzle is activated	<i>t<sub>bat</sub></i>	Four decimals	xx,xxxx	Not required	

### Domestic ovens

Parameter	Symbol	Technical documentation		Energy label and fiche	
		Rounding		Rounding	
Energy Efficiency Index	EEI <sub>cavity</sub>	One decimal	xx,x	One decimal	xx,x
Standard Energy Consumption (electricity)	SEC <sub>electric cavity</sub>	Two decimals	xx,xx	No rule	
Standard Energy Consumption (gas)	SEC <sub>gas cavity</sub>	Two decimals	xx,xx	No rule	
Volume of the cavity	V	Nearest integer	xx	Nearest integer	xx
Energy consumption to heat a standardised load in an electric heated oven	EC <sub>electric cavity</sub>	Two decimals	xx,xx	Two decimals	xx,xx
Energy consumption to heat a standardised load in a gas fires cavity	EC <sub>gas cavity</sub>	Two decimals	xx,xx	Two decimals	xx,xx

### Range hoods

Parameter	Symbol	Technical documentation		Energy label and fiche	
		Rounding		Rounding	
Energy Efficiency Index	EEI <sub>hood</sub>	One decimal	xx,x	Not required	
Standard Annual Energy Consumption	SAEC <sub>hood</sub>	One decimal	xx,x	Not required	
Annual Energy Consumption	AEC <sub>hood</sub>	One decimal	xx,x	Energy label: Nearest integer Fiche: One decimal	xx xx,x
Electric power input of the range hood at the best efficiency point	W <sub>BEP</sub>	One decimal	xx,x	Not required	
Nominal electric power input of the lighting system of the range hood	W <sub>L</sub>	One decimal	xx,x	Not required	
Average lighting time per day	t <sub>L</sub>	No rule	xx	Not required	
Average running time per day for the range hood	t <sub>H</sub>	No rule	xx	Not required	
Electric power input in off-mode	P <sub>0</sub>	Two decimals	xx,xx	Two decimals	xx,xx
Electric power input in standby mode	P <sub>S</sub>	Two decimals	xx,xx	Two decimals	xx,xx

Time increase factor	$f$	One decimal	xx,x	Not required	
Fluid Dynamic Efficiency	$FDE_{hood}$	One decimal	xx,x	One decimal	xx,x
Flow rate at the best efficiency point	$Q_{BEP}$	One decimal	xx,x	Not required	
Static pressure difference at the best efficiency point	$P_{BEP}$	Nearest integer	xx	Not required	
Lighting efficiency	$LE_{hood}$	Nearest integer	xx	One decimal	xx,x
Average illumination of the lighting system on the cooking surface	$E_{average}$	Nearest integer	xx	Not required	
Grease Filtering Efficiency	$GFE_{hood}$	One decimal	xx,x	One decimal	xx,x
Mass of oil in the grease filter	$w_g$	One decimal	xx,x	Not required	
Mass of oil retained in the airways of the range hood	$w_r$	One decimal	xx,x	Not required	
Mass of oil retained in the absolute filter	$w_t$	One decimal	xx,x	Not required	
Noise value (weighted average value)	$L_{WA}$	Nearest integer	xx	Nearest integer	xx
A-weighted sound power emission at minimum and maximum speed available in normal use	-	Nearest integer	xx	Nearest integer	xx
A-weighted sound power emission at intensive or boost setting (if applicable)	-	Nearest integer	xx	Nearest integer	xx
Air flow at minimum and maximum speed at normal use	-	One decimal	xx,x	Nearest integer	xx
Air flow at intensive or boost setting (if applicable)	-	One decimal	xx,x	Nearest integer	xx

## Television

Parameter	Symbol	Technical documentation		Energy label and fiche	
		Rounding		Rounding	
Visible screen area	A	No rule		No rule	
On-mode power consumption	P	One decimal	xx,x	Nearest integer	xx
Annual on-mode energy consumption	E	No rule		Nearest integer	xx
Power consumption in standby and/or off-mode	-	Two decimals	xx,xx	No rule	
Screen resolution	-	Not required		No rule	

## Professional refrigerated storage cabinets

Parameter	Symbol	Technical documentation		Energy label and fiche	
		Rounding		Rounding	
Energy Efficiency Index	EEI	Two decimals	x,xx	No rule	
Annual electricity consumption	AEC	Two decimals	x,xx	Nearest integer	xx
Energy consumption of the cabinet over 24 hours	E24h	No rule		Nearest integer	xx
Standard annual energy consumption	SAEC	No rule		No rule	
Net volume	V <sub>n</sub>	One decimal	xx,x	Nearest integer	xx

## Ventilation units

Parameter	Symbol	Technical documentation		Energy label and fiche	
		Rounding		Rounding	
Specific energy consumption	SEC	No rule		Energy label: Not required Product fiche: No rule	
Maximum flow rate	-	No rule		Energy label: Nearest integer Product fiche: No rule	xx
Sound power level	L <sub>WA</sub>	No rule		Nearest integer	xx

## Space heaters, combination heater

Parameter	Symbol	Technical documentation		Energy label and fiche	
		Rounding		Rounding	
Seasonal space heating energy efficiency	$\eta_s$	Nearest integer	xx	Nearest integer	xx
Water heating energy efficiency	$\eta_{wh}$	Nearest integer	xx	Nearest integer	xx
Annual energy consumption	AEC	Nearest integer	xx	Nearest integer	xx
Rated heat output	P <sub>rated</sub>	Nearest integer	xx	Nearest integer	xx
Sound power level	L <sub>WA</sub>	Nearest integer	xx	Nearest integer	xx
Auxiliary electricity consumption in standby mode	P <sub>SB</sub>	Three decimal	xx,xxx	Two decimal	xx,xx
Daily electricity consumption	Q <sub>elec</sub>	Three decimal	xx,xxx	Not required	
Daily fuel consumption	Q <sub>fuel</sub>	Three decimal	xx,xxx	Not required	

Note: Rounding rules for other parameters of technical documentation can be found in and in Table 7 and 8 of Annex V and rounding rules for other parameters of product fiche can be found in Annex IV.





## Water heaters and hot water tanks

Parameter	Symbol	Technical documentation		Energy label and fiche	
		Rounding		Rounding	
Water heating energy efficiency	$\eta_{wh}$	One decimal	x,x	Nearest integer	xx
Annual electricity consumption	AEC	Nearest integer	xx	Nearest integer	xx
Annual fuel consumption	AFC	Nearest integer	xx	Nearest integer	xx
Sound power level	$L_{WA}$	Nearest integer	xx	Nearest integer	xx
Standing loss		Nearest integer	xx	Nearest integer	xx
Storage volume		Nearest integer	xx	Nearest integer	xx
Daily electricity consumption	$Q_{elec}$	Three decimal	xx,xxx	Not required	
Daily fuel consumption	$Q_{fuel}$	Three decimal	xx,xxx	Not required	
Weekly electricity consumption	$Q_{elec,week}$	Three decimal	xx,xxx	Not required	
Weekly fuel consumption	$Q_{fuel,week}$	Three decimal	xx,xxx	Not required	
Collector aperture area	$A_{sol}$	Two decimal	xx,xx	Two decimal	xx,xx
Zero-loss efficiency	$\eta_0$	Three decimal	xx,xxx	Three decimal	xx,xxx
First-order coefficient	$a_1$	Two decimal	xx,xx	Two decimal	xx,xx
Second-order coefficient	$a_2$	Three decimal	xx,xxx	Three decimal	xx,xxx
Incidence angle modifier	IAM	Two decimal	xx,xx	Two decimal	xx,xx
Pump power consumption	solpump	Two decimal	xx,xx	Nearest integer	xx
Standby power consumption	solstandby	Two decimal	xx,xx	Two decimal	xx,xx
Annual non-solar heat contribution	$Q_{nonsol}$	One decimal	xx,x	Nearest integer	xx
Annual auxiliary electricity consumption	$Q_{aux}$	One decimal	xx,x	Nearest integer	xx