

**Disclaimer:**

**This is a working document supporting the revision of COMMISSION REGULATION (EU) 2019/1782 of 1 October 2019 laying down ecodesign requirements for external power supplies. It sets out a draft of the revised legal text to support the stakeholders' consultation process, in particular the Consultation Forum meeting of 24 November 2023.**

**Please note that while this draft document has been prepared by DG ENER staff and its consultants, it is by no means an official document endorsed by the European Commission.**

*ANNEX I*  
**Ecodesign requirements**

1. Energy efficiency requirements:

From one year after entry into force of this regulation the following energy efficiency requirements shall apply:

- (a) The no-load condition power consumption of external power supplies shall not exceed the following values:

	AC-AC external power supplies, except low voltage and multiple voltage output external power supplies	AC-DC external power supplies, except low voltage and multiple voltage output external power supplies	Low voltage external power supplies	Multiple voltage output external power supplies
$P_o \leq 49,0 \text{ W}$	0,185 W	0,075 W	0,075 W	0,10 W
$P_o > 49,0 \text{ W}$	0,185 W	0,15 W	0,15 W	0,15 W

- (b) The 10% load condition active efficiency shall be not less than the following values for external power supplies with a nameplate output power of 10 W or less:

	AC-AC external power supplies, except low voltage and multiple voltage output external power supplies	AC-DC external power supplies, except low voltage and multiple voltage output external power supplies	Low voltage external power supplies	Multiple voltage output external power supplies
--	---	---	-------------------------------------	---

$P_o \leq 1,0 \text{ W}$	$0,5 \times P_o/1W + 0,119$	$0,5 \times P_o/1W + 0,119$	$0,517 \times P_o/1W + 0,041$	$0,497 \times P_o/1W + 0,017$
$1 \text{ W} < P_o \leq 49,0 \text{ W}$	$0,071 \times \ln(P_o/1W) - 0,00115 \times P_o/1W + 0,62$	$0,071 \times \ln(P_o/1W) - 0,00115 \times P_o/1W + 0,62$	$0,0834 \times \ln(P_o/1W) - 0,0011 \times P_o/1W + 0,559$	$0,0703 \times \ln(P_o/1W) + 0,000406 \times P_o/1W + 0,578$
$P_o > 49,0 \text{ W}$	0,84	0,84	0,83	0,835

- (c) The average active efficiency of external power supplies shall be not less than the following values:

	AC-AC external power supplies, except low voltage and multiple voltage output external power supplies	AC-DC external power supplies, except low voltage and multiple voltage output external power supplies	Low voltage external power supplies	Multiple voltage output external power supplies
$P_o \leq 1,0 \text{ W}$	$0,5 \times P_o/1W + 0,169$	$0,5 \times P_o/1W + 0,169$	$0,517 \times P_o/1W + 0,091$	$0,497 \times P_o/1W + 0,067$
$1 \text{ W} < P_o \leq 49,0 \text{ W}$	$0,071 \times \ln(P_o/1W) - 0,00115 \times P_o/1W + 0,67$	$0,071 \times \ln(P_o/1W) - 0,00115 \times P_o/1W + 0,67$	$0,0834 \times \ln(P_o/1W) - 0,0011 \times P_o/1W + 0,609$	$0,0703 \times \ln(P_o/1W) + 0,000406 \times P_o/1W + 0,628$
$P_o > 49,0 \text{ W}$	0,890	0,890	0,880	0,885

- (d) The stand-by power consumption of wireless charging pads shall be not higher than 0.48 W, and of wireless chargers with the power supply integrated into the same unit not higher than 0.8 W.

2. Interoperability requirements:

From two years after entry into force the following of this regulation the following interoperability requirements shall apply:

- (a) An AC/DC external power supply shall be a USB power supply, unless it fulfils at least one of the following conditions:
- i. nameplate output power greater than 240 W.

- ii. intended to be used in a wet environment requiring an liquid ingress protection level (IPX) greater than zero.
  - ii. must withstand antistatic discharge in accordance with IEC 61000-4-2 at levels higher than 4 kV for contact discharge and 8 kV for air discharge.
  - iii. intended to operate in inaccessible locations or in harsh environments.
  - iv. intended to be used only with toys.
  - v. intended to be used with non-battery powered audio equipment.
  - vi. intended to be used with non-battery powered products with peak-power demand.
  - vii. is subject to technically justified cases where the powered equipment necessarily requires:
    - input voltage higher than 20 V and input power less than 100 W, or
    - input voltage higher than 28 V and input power less than 140 W, or
    - input voltage higher than 36 V and input power less than 180 W.
- (b) The USB Type-A and USB Type-C receptacles of USB power supplies shall remain accessible and operational, and, where applicable, the USB power delivery shall remain fully functional at all times.
- (c) The following equipment shall be powered by USB power supplies:
- i. battery chargers with an input power not exceeding 240 W, excepting those used with an integrated mains plug for direct insertion into socket outlets.
  - ii. charging cradles intended to be used with the equipment under the scope of point 2(a).
  - ii. wireless chargers intended to be used with the equipment under the scope of point 2(a).
- (d) An external power supply which has a receptacle with the physical dimensions of a USB Type-A or a USB Type-C receptacle, but is not in compliance with the corresponding standards laid down in Article 2, shall have at least one additional USB Type-A or USB Type-C receptacle.
- (e) USB-PD power supplies that have engaged over-current protection shall attempt to resume default operation after determining that the cause of over current is no longer present, and the USB-PD power supplies that have engaged over-temperature protection shall attempt to resume default operation.

### 3. Durability requirements

- (a) From two years after entry into force of this regulation, external power supplies shall have in line with requirements R14 and R15 of ETSI ES 202 874-1 V1.2.1:
- an expected lifetime of 10 years continual operation at maximum output power.
  - a minimum Mean Time Between Failures (MTBF) of 300 000 hours.
- (b) From two years after entry into force of this regulation, USB power supplies shall meet the resistibility requirements for the 2.5 kV basic test levels of the tests

numbered 5.1.1.a, 5.1.1.b and 5.1.1.c in “Table 5 - Test conditions for mains power ports“ from the ITU-T Recommendation K.21 (08/2022).

4. Information requirements:

- (a) From one year after entry into force of this regulation, the nameplate of external power supplies shall include the following information:

Nameplate information	Value and precision	Unit	Notes
Output power	XXX.X	W	If more than one physical output or more than one output voltage at the same output are measured, the combinations of available output voltage, maximal output current and maximal output power shall be given.
Output voltage	XX.X	V	
Output current	XX.X	A	

- (b) From one year after entry into force of this regulation, the nameplate of external power supplies shall display the following information:

Nameplate information	Value and precision	Unit	Notes
Efficiency(EU)	XX.X	%	Efficiency means the declared average active efficiency.  For multiple voltage power supplies and adaptive power supplies it means the arithmetical mean of the declared average active efficiency at the lowest and the highest fixed output voltage supported.

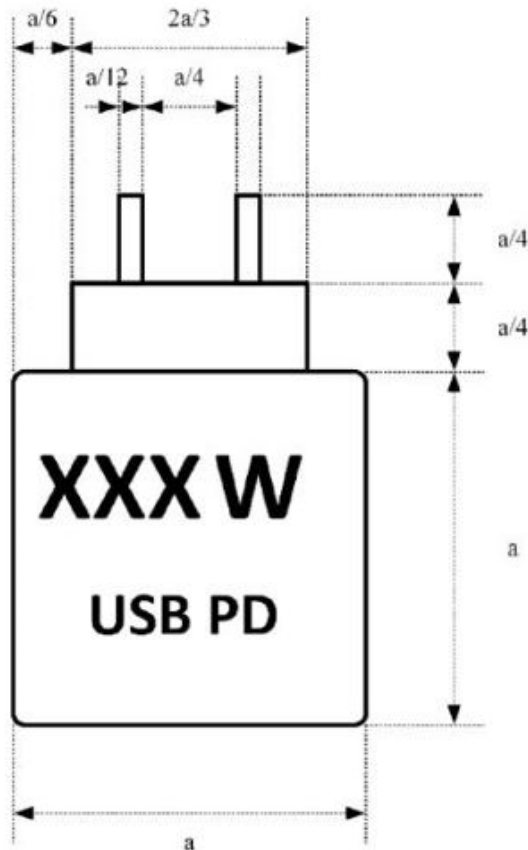
- (c) From two years after entry into force of this regulation, any USB power supply shall be marked at each receptacle with its maximum output power, and whether it is compatible with USB power delivery. Shared capacity ports shall indicate graphically that the maximum output power is shared among them. The marking shall be durable, indelible, and the font size shall not be less than 2.56 mm height.

The marking shall contain the following text, where ‘XXX’ is the value of the maximum power in W:

- i. for USB-PD external power supplies:  
“USB PD XXX W”.

- ii. for USB power supplies not supporting power delivery:  
“USB XXX W”.

- (d) From two years after entry into force of this regulation, an external power supply which has a receptacle with the physical dimensions of a USB Type-A or a USB Type-C receptacle, but is not in compliance with the corresponding standards down in Article 2, shall not display the text “USB” or “PD” on its nameplate or enclosure.
- (e) From two years after entry into force of this regulation, the following pictogram shall be printed on the enclosure of a USB power supply. It shall also be printed on its packaging or affixed to the packaging as a sticker.



The pictogram may vary in appearance (e.g. as to its colour, solid or hollow, line thickness), provided that it remains visible and legible. The dimension ‘a’ shall be greater than or equal to 7 mm. If the pictogram is reduced or enlarged, the proportions set out in the drawings shall be maintained. The letters ‘XXX’ shall be replaced by the value of the maximum output power. ‘USB PD’ shall be displayed if the USB power supply supports power delivery.

- (f) From one year after entry into force of this regulation, the information required by this regulation to be provided on the nameplate or enclosure of an external power supply shall be displayed with a contrast ratio of at least 3:1 as defined by ISO-9241-3 or ANSI-HFES-100-1988.
- (g) From one year after entry into force of this regulation, instruction manuals for end-users (where applicable), and free access websites of manufacturers, importers or authorised representatives shall include the following information, in the order as set out below:

Information published	Value and precision	Unit	Notes
Manufacturer's name or trade mark, commercial registration number and address	-	-	-
Model identifier	-	-	-
Input voltage	XXX	V	Specified by the manufacturer. Shall be a value or a range.
Input AC frequency	XX	Hz	Specified by the manufacturer. Shall be a value or a range.
Output voltage	XX.X	V	Nameplate output voltage. Shall indicate whether is AC or DC.
Output current	XX.X	A	If more than one physical output or more than one output voltage at the same output are measured, the combinations of available output voltage, maximal output current and maximal output power shall be published.
Output power	XXX.X	W	
Average active efficiency	XX.X	%	Declared by the manufacturer based on the value calculated as arithmetical mean of efficiency at load conditions 1-4.  If multiple average active efficiencies are declared for multiple output voltages or multiple output voltages at the same output, the values published shall be the average active efficiencies declared for the lowest and highest output voltage.
Efficiency at low load (10 %)	XX.X	%	Declared by the manufacturer based on the value calculated at load condition 5.  External power supplies with a nameplate output power of 10 W or less shall be exempted from this requirement.  If average active efficiencies are declared for multiple output voltages or multiple output voltages at the same output, the

			value published shall be the value declared for the lowest and highest output voltage.
No-load power consumption	X.XX	W	Declared by the manufacturer based on the value measured for load condition 6.

The relevant load conditions are as follows for external power supplies other than USB-PD power supplies, and for USB-PD power supplies at output voltages higher than the lowest achievable active output voltage:

Percentage of nameplate output current	
Load condition 1	100 % ± 2 %
Load condition 2	75 % ± 2 %
Load condition 3	50 % ± 2 %
Load condition 4	25 % ± 2 %
Load condition 5	10 % ± 1 %
Load condition 6	0 % (no-load condition)

For USB-PD power supplies, the load conditions at the lowest achievable active output voltage are as follows:

Load condition 1	2 A ± 2 %
Load condition 2	1.5 A ± 2 %
Load condition 3	1 A ± 2 %
Load condition 4	0.5 A ± 2 %
Load condition 5	0.2 A ± 1 %
Load condition 6	0 % (no-load condition)

- (h) From one year after entry into force of this regulation, the technical documentation of external power supplies for the purposes of conformity assessment pursuant to Article 4 shall contain the following elements:
- (1) for external power supplies with a nameplate output power greater than 10 watts:

Reported Quantity	Description
Root mean square output current (mA)	Measured at load conditions 1-5. For USB-PD external power supplies measured also at 100% nameplate current.
Root mean square output voltage (V)	
Active output power (W)	
Root mean square input voltage (V)	Measured at load conditions 1-6. For USB-PD external power supplies measured also at 100% nameplate current.
Root mean square input power (W)	
Total harmonic distortion of the input current	
True power factor	
Power consumed (W)	Calculated at load conditions 1-5, measured at load condition 6. For USB-PD external power supplies calculated also at 100% nameplate current.
Active mode efficiency	Calculated at load conditions 1-5.
Average active efficiency	Arithmetical mean of efficiency at load conditions 1-4

If more than one physical output or more than one output voltage at the same output are measured, the relevant reported quantities shall be specified for each measurement.

The relevant load conditions are set out in point 4(g);

(2) for external power supplies with a nameplate output power of 10 watts or less:



Reported Quantity	Description
Root mean square output current (mA)	Measured at load conditions 1-4. For USB-PD external power supplies measured also at 100% nameplate current.
Root mean square output voltage (V)	
Active output power (W)	
Root mean square input voltage (V)	Measured at load conditions 1-4 and 6. For USB-PD external power supplies measured also at 100% nameplate current.
Root mean square input power (W)	
Total harmonic distortion of the input current	
True power factor	
Power consumed (W)	Calculated at load conditions 1-4, measured at load condition 6. For USB-PD external power supplies calculated also at 100% nameplate current.
Active mode efficiency	Calculated at load conditions 1-4.
Average active efficiency	Arithmetical mean of efficiency at load conditions 1-4.

If more than one physical output or more than one output voltage at the same output are measured, the relevant reported quantities shall be specified for each measurement.

The relevant load conditions are set out in point 2(b).

- (i) From two years after entry into force of this regulation, the technical documentation of external power supplies for the purposes of conformity assessment pursuant to Article 4 shall contain the following information:

Exemption from USB requirement in light of article 2(a) of Annex I	yes/no	Description and justification, where applicable
nameplate output power greater than 240 W		
Liquid ingress protection level (IPX) greater than zero		
electrostatic discharge immunity higher than 4 kV for contact discharge and 8 kV for air discharge.		
intended usage in inaccessible locations or in harsh environments		
intended to be used with toys		
intended to be used with non-battery powered audio equipment		
intended to be used with non-battery powered products with peak-power demand.		
powered equipment necessarily requiring: - input voltage higher than 20 V and input power less than 100 W, or - input voltage higher than 28 V and input power less than 140 W, or - input voltage higher than 36 V and input power less than 180 W.		

3. Measurements and calculations

For the purposes of compliance and verification of compliance with the requirements of this Regulation, measurements and calculations shall be made using harmonised standards the reference numbers of which have been published for this purpose in the

Official Journal of the European Union, or other reliable, accurate and reproducible methods, which take into account the generally recognised state of the art.

## *ANNEX II*

### **Transitional test methods**

1. An adaptive power supply shall be tested at the lowest and highest output voltage.
2. USB-PD power supplies shall be tested such that at the lowest achievable active output voltage the output current is 2 A at the 100% load condition 1. The 75%, 50%, 25% and 10% load conditions are scaled accordingly.
3. If the external power supply is not supplied with a cable, it must be tested with a 91.44 cm (3 ft) long output wire or cable with a conductor thickness that is minimally sufficient to carry the maximum required current.

## *ANNEX III*

### **Verification procedure for market surveillance purposes**

The verification tolerances defined in this Annex relate only to the verification of the measured parameters by Member State authorities and shall not be used by the manufacturer, importer or authorised representative as an allowed tolerance to establish the values in the technical documentation or in interpreting these values with a view to achieving compliance or to communicate better performance by any means.

As part of verifying the compliance of a product model with the requirements laid down in this Regulation pursuant to Article 3, point 2 of Directive 2009/125/EC, for the requirements referred to in this Annex, the authorities of the Member States shall apply the following procedure:

1. The Member State authorities shall verify one single unit of the model.
2. The model shall be considered to comply with the applicable requirements if:
  - (a) the values given in the technical documentation pursuant to point 2 of Annex IV to Directive 2009/125/EC (declared values), and, where applicable, the values used to calculate these values, are not more favourable for the manufacturer, importer or authorised representative than the results of the corresponding measurements carried out pursuant to paragraph (g) thereof; and
  - (b) the declared values meet any requirements laid down in this Regulation, and any required product information published by the manufacturer, importer or authorised representative does not contain values that are more favourable for the manufacturer, importer or authorised representative than the declared values; and
  - (c) when the Member State authorities test the unit of the model, the determined values (the values of the relevant parameters as measured in testing and the values calculated from these measurements) comply with the respective verification tolerances as given in Table 1; and
  - (d) when the Member State authorities check the unit of the model, it complies with the information requirements in point 2 of Annex II.
3. If the results referred to in point 2(a), (b) or (d) are not achieved, the model and all equivalent models shall be considered not to comply with this Regulation.

4. If the result referred to in point 2(c) is not achieved, the Member State authorities shall select three additional units of the same model for testing. As an alternative, the three additional units selected may be of one or more equivalent models.
5. The model shall be considered to comply with the applicable requirements if, for these three units, the arithmetical mean of the determined values complies with the respective verification tolerances given in Table 1.
6. If the result referred to in point 5 is not achieved, the model and all equivalent models shall be considered not to comply with this Regulation.
7. The Member State authorities shall provide all relevant information to the authorities of the other Member States and to the Commission without delay after a decision is taken on non-compliance of the model according to points 3 or 6.

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

The Member State authorities shall only apply the verification tolerances that are set out in Table 1 and shall use only the procedure described in points 1 to 7 for the requirements referred to in this Annex. For the parameters in Table 1, no other tolerances, such as those set out in harmonised standards or in any other measurement method, shall be applied.

**Table 1 – Verification tolerances**

<i>Parameters</i>	<i>Verification tolerances</i>
No-load condition	The determined value* shall not exceed the declared value by more than 0,01 W.
Active mode efficiency at each of the applicable load conditions	The determined value* shall not be lower than the declared value by more than 5 %.
Average active efficiency	The determined value* shall not be lower than the declared value by more than 5 %.

\*In the case of three additional units tested as prescribed in point 4, the determined value means the arithmetical mean of the values determined for these three additional units.

*ANNEX IV*  
**Benchmarks**

At the time of entry into force of this Regulation, the best available technology on the market for external power supplies in terms of their no-load power consumption and average active efficiency was identified as follows:

(a) No-load condition:

The lowest available no-load condition power consumption of external power supplies can be approximated as:

- 0,002 watt, for  $P_O \leq 49,0$  watts;
- 0,010 watt, for  $P_O > 49,0$  watts.

(b) Average active efficiency:

The best available active average efficiency of external power supplies can be approximated as:

- 0,767, for  $P_O \leq 1,0$  watt;
- 0,905, for  $1,0 \text{ watt} < P_O \leq 49,0$  watts;
- 0,962, for  $P_O > 49,0$  watts.