



SLOVENSKI STANDARD

SIST EN 60350-1:2013

01-november-2013

Nadomešča:
SIST EN 50304:2009

Gospodinjiski električni kuhalni aparati - 1. del: Štedilniki, pečice, parne pečice in žari - Metode za merjenje funkcionalnosti (IEC 60350-1:2011, spremenjen + popravek, februar 2012)

Household electric cooking appliances - Part 1: Ranges, ovens, steam ovens and grills - Methods for measuring performance (IEC 60350-1:2011, modified + corrigendum Feb. 2012)

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Elektrische Kochgeräte für den Hausgebrauch - Teil 1: Herde, Backöfen, Dampfgarer und Grillgeräte - Verfahren zur Messung der Gebrauchseigenschaften (IEC 60350-1:2011, modifiziert + corrigendum Feb. 2012)

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Appareils de cuisson électrodomestiques - Partie 1: Cuisinières, fours, fours à vapeur et grills - Méthodes de mesure de l'aptitude à la fonction (CEI 60350-1:2011, modifiée + corrigendum Feb. 2012)

Ta slovenski standard je istoveten z: EN 60350-1:2013

ICS:

97.040.20	Štedilniki, delovni pulti, pečice in podobni aparati	Cooking ranges, working tables, ovens and similar appliances
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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 60350-1

July 2013

ICS 97.040.20

Supersedes EN 50304:2009 (partially) + A1:2010 (partially)

English version

**Household electric cooking appliances -
Part 1: Ranges, ovens, steam ovens and grills -
Methods for measuring performance**
(IEC 60350-1:2011, modified + corrigendum Feb. 2012)

Appareils de cuisson électrodomestiques -
Partie 1: Cuisinières, fours, fours à vapeur
et grills -
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fonction
(CEI 60350-1:2011, modifiée +
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Elektrische Kochgeräte für den
Hausgebrauch -
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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

This document (EN 60350-1:2013) consists of the text of IEC 60350-1:2011 + corrigendum Feb. 2012 prepared by IEC/SC 59K "Ovens and microwave ovens, cooking ranges and similar appliances", of IEC/TC 59 "Performance of household and similar electrical appliances", together with the common modifications prepared by CLC/TC 59X "Performance of household and similar electrical appliances".

The following dates are fixed:

- latest date by which this document has to be implemented (dop) 2014-06-03
at national level by publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting (dow) 2016-06-03
with this document have to be withdrawn

Together with EN 60350-2:2013, this document supersedes EN 50304:2009/EN 60350:2009 + A1:2010/A11:2010.

EN 60350-1:2013 includes the following significant technical changes with respect to EN 50304:2009/EN 60350:2009:

- the scope is revised (Clause 1). The ovens covered by this standard may be with or without microwave function. Steam ovens are included;
- new definitions for "Set to off mode" and "Set to standby mode" are included in Clause 3;
- the usable volume is reworded in calculated volume (6.2);
- performance measurements for steam ovens are described in 7.3 and Clause 8;
- an option for assessing the heat distribution with a digital measurement system is included in 7.5.2.4;
- Clause 12 "Standby power" is renamed to "Consumption measurement of low power modes" and the content is adapted to EN 50564;
- a measurement method for measuring the consumption of the cooling down period is added in the informative Annex ZB;
- a measurement method to check applied Microwave Energy during the measurement according to 7.4 is added in the informative Annex ZC.

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 60350-1:2011 are prefixed "Z".

Words in **bold** in the text are defined in Clause 3.

According to the decision D137/061 for CLC/TC 59X, this European Standard has been drawn up as a document which follows, as far as suitable, the structure of IEC 60350-1:2011.

It also describes the evaluation of data declared by the manufacturer and control procedures for checking these values.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association.

This European Standard is suitable for direct comparison and is considered sufficiently reproducible within given limits for the purpose of energy labelling according to the EU Directive 2010/30/EU on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products. All paragraphs which are relevant for the measuring of energy labelling are listed in Annex ZA.

Endorsement notice

The text of the International Standard IEC 60350-1:2011 + corrigendum Feb. 2012 was approved by CENELEC as a European Standard with agreed common modifications.

COMMON MODIFICATIONS

2 Normative references

Replace IEC 62301:2005 by

EN 50564:2011, *Electrical and electronic household and office equipment – Measurement of low power consumption (IEC 62301:2011, mod.)*

3 Terms and definitions

Add the following new definitions to Clause 3:

3.Z1

cooling down period

unstable condition persisting after completion of the active mode and the appliance is set to off mode where the power consumption may change without any intervention by the user

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3.Z2

set to off mode

action where the product is switched off using appliance controls or switches that are accessible and intended for operation by the user during normal use to attain the lowest power consumption that may persist for an indefinite time while connected to a main power source and used in accordance with the manufacturer's instructions

Note 1 to entry: All actions required to **set to off mode** like for example empty the water tank, remove food, close the door etc. have to be taken.

Note 2 to entry: For definition of off mode, EN 50564:2011 is relevant.

3.Z3

set to standby mode

action where the product is switched to standby using appliance controls or switches that are accessible and intended for operation by the user during normal use to attain the lowest power consumption that may persist for an indefinite time while connected to a main power source and used in accordance with the manufacturer's instructions.

Note 1 to entry: For definition of standby mode, EN 50564:2011 is relevant.

5.2 Electricity supply

*In the 3rd paragraph (starting with "For tests 7.2, 7.4 and 7.5.3,"), **replace** the two dashes by*

"the supply voltage shall be maintained at the main terminal at 230 V ± 1 % or at 400 V ± 1 % as defined by the manufacturer's installation guide, while the heating elements are switched on. The supply frequency shall be at a nominal 50 Hz ± 1 %."

Add the following at the end of 5.2:

For Clause 12 and Annex ZB, the power measurement requirements shall be in accordance with EN 50564.

5.3 Instrumentation

Add the following at the end of 5.3:

For Clause 12 and Annex ZB, the power measurement requirements shall be in accordance with EN 50564.

7.4.4.1 Electric energy consumption

Add the following at the end of 7.4.4.1:

As an example for data and calculation sheet, see Annex E. An Excel 97-2003 evaluation program, which corresponds directly to Annex E, is available with this European Standard for the automatic calculation of the energy consumption (see 7.4). These calculations may be made in any other spreadsheet programs that lead to equal results.

7.4.4.2 Time for heating the load

Delete the note at the end of 7.4.4.2.

Add the following new subclause 7.Z1 between 7.4 and 7.5:

7.Z1 Measurement uncertainty of results

For test 6.2, 6.4, 7.2 and 7.4:

7.Z1.1 Energy consumption with a load

The energy consumptions determined according to 7.4 shall not be greater than the value declared by the manufacturer plus 10 % plus 0,040 kWh.

If the result of the test carried out on the first appliance is greater than the declared value plus 10 % plus 0,040 kWh the test shall be carried out on a further three appliances, which shall be randomly selected from the market.

The arithmetical mean of the values of these three appliances shall not be greater than the declared value plus 6 % plus 0,040 kWh.

7.Z1.2 Energy consumption for pre-heating an empty oven

The energy consumptions determined according to 7.2 shall not be greater than the value declared by the manufacturer plus 15 %.

If the result of the test carried out on the first appliance is greater than the declared value plus 15 % the test shall be carried out on a further three appliances, which shall be randomly selected from the market.

The arithmetical mean of the values of these three appliances shall not be greater than the declared value plus 10 %.

7.Z1.3 Preheating time of the empty oven

The preheating time of the empty oven measured according to 7.2 shall not be greater than the value declared by the manufacturer plus 15 %.

If the result of the test carried out on the first appliance is greater than the declared value plus 15 %, the test shall be carried out on a further three appliances, which shall be randomly selected from the market.

The arithmetical mean of the values of these three appliances shall not be greater than the declared value plus 10 %.

7.Z1.4 Time for heating the load

The time determined according to 7.4 shall not be greater than the value declared by the manufacturer plus 15 %.

If the result of the test carried out on the first appliance is greater than the declared value plus 15 %, the test shall be carried out on a further three appliances, which shall be randomly selected from the market.

The arithmetical mean of the values of these three appliances shall not be greater than the declared value plus 10 %.

7.Z1.5 Oven volume

The volume determined according to 6.2 shall not differ from the value declared by the manufacturer plus or minus 5 %.

If the result of the test carried out on the first appliance differs from the declared value by more than plus or minus 5 %, the test shall be carried out on a further three appliances, which shall be randomly selected from the market.

The arithmetical mean of the values of these three appliances shall not differ from the declared value by more than plus or minus 3 %.

7.Z1.6 Surface area

The surface area determined according to 6.4 shall not differ from the value declared by the manufacturer plus or minus 5 %.

If the result of the test carried out on the first appliance differs from the declared value by more than plus or minus 5 %, the test shall be carried out on a further three appliances, which shall be randomly selected from the market.

The arithmetical mean of the values of these three appliances shall not differ from the declared value by more than plus or minus 3 %.

12 Standby power

Replace the whole Clause 12 by the following:

12 Consumption measurement of low power modes

In addition to EN 50564, the following requirements are given.

For an appliance composed of a combination of separate units which may consist of one of a variety of different hobs and one of a variety of different ovens, the recommended combination as declared in the manufacturer's instruction is used for the test.

If appliance A (e.g. hob) can only be operated combined with appliance B (e.g. oven), first the low power mode for appliance B without appliance A is measured and noted. Afterwards the low power mode for the appliance B combined with the appliance A is measured. The low power consumption of appliance A is calculated by the difference between these two measurements.

When preparing the test report for a device composed of a combination of separate units, the combination of types of main powered parts (hobs, ovens, grills, warming plates, griddles etc.) used for the measurement shall be recorded. The consumption of low power modes shall be noted for each unit A and B separately.

NOTE The measurement procedure for energy consumption of hobs is described in EN 60350-2.

When testing appliances that are fitted with a clock, the clock shall be adjusted to the correct time and date as specified in the instructions.

In case energy consumption is influenced by continuous changing displayed time of a clock, a measurement period of 24 h is necessary. The average value from this measurement is noted.

If the appliance has an ambient light sensor, two illuminance levels in accordance to EN 50564 shall be measured during the 24 h period, each illuminance level for 12 h.

If an option is provided to the user to switch off the display, both the switched on and switched off mode are to be tested and reported.

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Replace the existing Annex E by the following:

Annex E
(informative)

Calculation sheet: Energy consumption for heating a load (7.4)

Brand & Factory:	Oven Type / Model:	Testlab:
Rated Voltage:	Supply voltage:	Operator:
Rated Power:	Calculated Volume (6.2):	Date:

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Heating mode:		Conventional heating "ic"						nominal temperature rise:		180 K		
no.		bricks		measured		room	oven temperature					
dry weight	wet weight	absorbed water	end cooking weight	weight loss	start temperatures	energy consumption	time	average ambient temp.	nominal value	real value	real value	
m_d (g)	m_w (g)	Δm (g)	(informative) (g)	(informative) (g)	thermocouple no. 1 (°C)	E_k (kWh)	t_k (min)	(°C)	ΔT^{ic} (K)	(°C)	ΔT^{ic} (K)	
		calc.		calc.					140±10		calc.	
		calc.		calc.					180±10		calc.	
		calc.		calc.					220±10		calc.	
Results at $\Delta T_0 =$		180 K		$S * \Delta T_0 + B$		Slope S	Intercept B	Standard deviation σ				
Energy (linear regression)		(kWh)		calc.		calc.	calc.	calc.				
Time (linear regression)		(min)		calc.		calc.	calc.	calc.				

Cells with content "calc." should be calculated.

Calculation sheet: Energy consumption for heating a load (7.4) (continued)

Brand & Factory:	Oven Type / Model:	Testlab:
Rated Voltage:	Supply voltage:	Operator:
Rated Power:	Calculated Volume (6.2):	Date:

Heating mode: Forced air heating "if"							nominal temperature rise: 155 K						
bricks							measured		room	oven temperature			
no.	dry weight m_d (g)	wet weight m_w (g)	absorbed water Δm (g)	end cooking weight (informative) (g)	weight loss (informative) (g)	start temperatures thermocouple no. 1 no. 2 (°C) (°C)		energy consumption E_x (kWh)	time t_k (min)	average ambient temp. (°C)	nominal value ΔT^{ic} (K)	real value (°C)	real value ΔT^{ic} (K)
			calc.		calc.						135±10		calc.
			calc.		calc.						155±10		calc.
			calc.		calc.						175±10		calc.
Results at $\Delta T_0 = 155 K$			$S * \Delta T_0 + B$				Slope S		Intercept B		Standard deviation σ		
Energy (linear regression)			(kWh)				calc.		calc.		calc.		
Time (linear regression)			(min)				calc.		calc.		calc.		

Cells with content "calc." should be calculated.

Calculation sheet: Energy consumption for heating a load (7.4) (concluded)

Brand & Factory:	Oven Type / Model:	Testlab:
Rated Voltage:	Supply voltage:	Operator:
Rated Power:	Calculated Volume (6.2):	Date:

Heating mode: Hot steam "ih"							nominal temperature rise: 155 K						
bricks							measured		room	oven temperature			
no.	dry weight m_d (g)	wet weight m_w (g)	absorbed water Δm (g)	end cooking weight (informative) (g)	weight loss (informative) (g)	start temperatures thermocouple		energy consumption E_k (kWh)	time t_k (min)	average ambient temp. (°C)	nominal value ΔT^{ic} (K)	real value (°C)	real value ΔT^{ic} (K)
						no. 1 (°C)	no. 2 (°C)						
			calc.		calc.						135±10		calc.
			calc.		calc.						155±10		calc.
			calc.		calc.						175±10		calc.
Results at $\Delta T_0 = 155 \text{ K}$			$S * \Delta T_0 + B$				Slope S		Intercept B		Standard deviation σ		
Energy (linear regression)			calc.				calc.		calc.		calc.		
Time (linear regression)			calc.				calc.		calc.		calc.		

Cells with content "calc." should be calculated.

Add the following annexes.

Annex ZA (normative)

Overview – Clauses required for the EU Directive on Energy Labelling

For the procedure required for the EU Directive on Energy Labelling, the following clauses are applicable:

- 1 Scope
- 2 Normative references
- 3 Terms and definitions
- 5 General conditions for the measurements
- 6 Dimensions and mass
 - 6.2 Usable Internal dimensions and calculated volume of ovens
 - 6.4 Dimensions of shelves
 - 6.5 Dimensions of grill grids
- 7 Ovens and combi steam ovens
 - 7.2 Preheating the empty oven
 - 7.4 Energy consumption and time for heating a load
 - 7.Z1 Measurement uncertainty of results
- 12 Consumption measurement of low power modes

Figure 1 Position of the thermocouple for measuring ambient temperature

Figure 4 Usable internal dimensions and calculated volume of ovens

Figure 6 Example of a method of fixing a thermocouple for the test of 7.4

Annex C Addresses of suppliers
C.7 Brick for testing energy consumption of ovens

Annex D Description of the test brick

Annex E Calculation sheet: Energy consumption of electric ovens

Annex ZA Overview – Clauses required for the EU Directive on Energy Labelling

Annex ZB (informative)

Measurement of the energy consumption of the cooling down period

ZB.1 General

The purpose of this test is to measure the energy consumption of the **cooling down period**.

For cooking ranges, ovens and steam ovens the energy consumption of the **cooling down period** is measured.

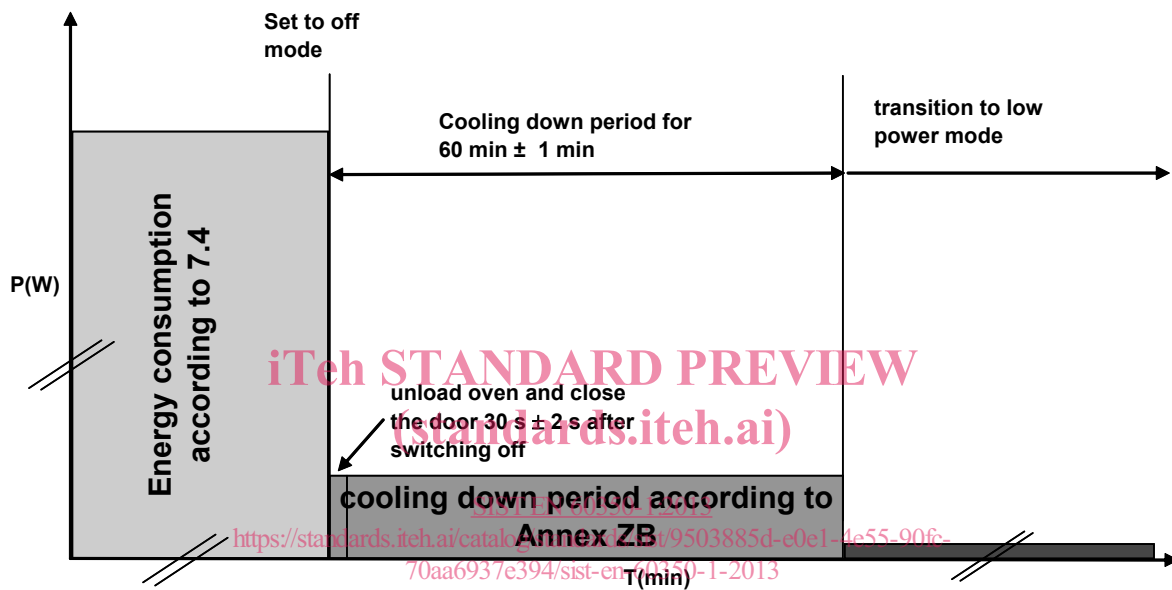


Figure ZB.1 – Phases of energy consumption measurement – Example

ZB.2 Preliminary measurements

For measuring the energy consumption of the cooling down period a pre-test to fix the relevant temperature setting is carried out.

A thermocouple is placed in the empty oven as described in Clause 7.

The temperature control is set to positions where the mean oven temperature rises ΔT_2^i as defined in Table 1 can be expected. The oven is run for some time without changing the setting until steady state conditions reached. The oven temperature is determined as the arithmetic mean between the maximum and minimum temperatures at steady state conditions.

NOTE Steady conditions are considered to be attained after five cycles of the thermostat or 1 h, whichever is shorter.

The temperature control setting is adapted until the arithmetic mean between the maximum and minimum temperature is $\Delta T_2^i \pm 5$ K. This temperature control setting is noted for measuring the energy consumption of the cooling down period.

The oven is cooled down to ambient temperature.

ZB.3 Measuring the energy consumption of the cooling down period

The procedure to prepare the brick stated in 7.4.2.2 and 7.4.2.3 is followed. The brick is positioned in the oven according to 7.4.3.1. The oven is switched on within 3 min from the removal of the brick from the refrigerator. The temperature control is set to the position determined in ZB.2. The oven is operated for the time $t_{\Delta T_0}^{i\dots}$ determined in 7.4.4.2.

The measurement shall be started by setting the appliance to **off mode**. The brick is removed and the door shall be closed after (30 ± 2) s. The measurement of the low power energy consumption is started immediately when the appliance is **set to off mode**.

If the appliance doesn't offer an off mode it is **set to standby mode**.

The measurement is stopped after 60 min \pm 1 min independent if the ventilation stops automatically.

The energy consumption for the cooling down period W_v is noted in Wh for each heating mode according to Table 1.

Ensure that the following conditions remain relevant for the duration of the measurement:

- connected to mains power for the duration of the test;
- no network is connected to the product.

ZB.4 Measurement uncertainty – Energy consumption for the cooling down period

The energy consumption for the cooling down period determined according to ZB.3 shall not be greater than the value declared by the manufacturer plus 15 %.

If the result of the test carried out on the first appliance is greater than the declared value plus 15 %, the test shall be carried out on a further three appliances, which shall be randomly selected from the market.

The arithmetical mean of the values of these three appliances shall not be greater than the declared value plus 10 %.

Annex ZC (informative)

Check of applied microwave energy during the measurement according to 7.4

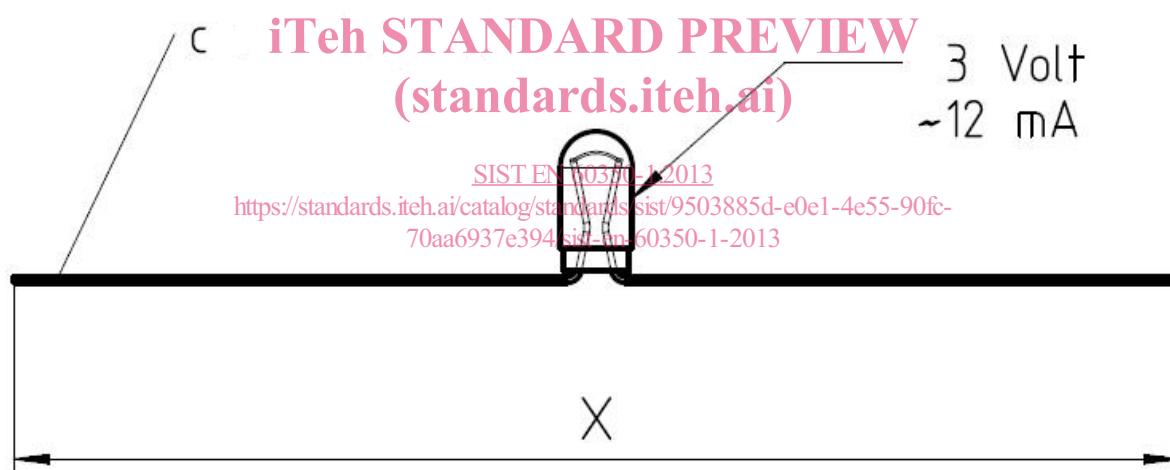
ZC.1 General

Heating up the brick according to 7.4 shall only be done with thermal heating. It is not allowed to switch on a magnetron even not for a short period.

The sophisticated method to check a possible applied microwave energy during the energy consumption measurement according to 7.1 is to proof if the magnetron is switched on and off. Depending on the design of the appliances it is not always possible to determine clearly if microwave energy is switched on during the long lasting heating up process. Therefore following method can be used in a pre-test.

ZC.2 Procedure

A filament lamp with a rated current of 12 mA and rated voltage less than 6 V with bended connecting wires is used. The length of the wires are approximately half of the wave length of the microwave so the current distribution is maximum in the middle where the filament of the lamp is (see Figure ZC.1).



Key

- c connecting wire
- x in the range of 50 mm to 60 mm

Figure ZC.1 — Filament lamp

The brick is prepared as described in 7.4.2.3 and placed in the oven as described in 7.4.3.1 The filament lamp is placed on the upper surface of the wet brick. The oven is switched on and operated according to 7.4.3.1 for at least this time which is necessary to have a temperature rise in the brick of 55 K.

Then the oven is switched off and the filament lamp is tested. If microwave energy was applied the electric field during microwave operation will induce currents much more than 12 mA so the filament will be damaged. The lamp can be tested with a resistance-test-equipment or with a small tester for LED lamps. The lamp is put into a socket and the filament will light up if it is not damaged. Otherwise microwave energy was applied.