SLOVENSKI STANDARD
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Poraba energije prodajnih avtomatov

Energy consumption of vending machines

Energieverbrauch von Verkaufsautomaten

Consommation d'énergie des distributeurs automatiques

Ta slovenski standard je istoveten z: EN 50597:2018

ICS:

27.010	Prenos energije in toplote na splošno	Energy and heat transfer engineering in general
55.230	Razdelilni in prodajni avtomati	Distribution and vending machines

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English Version

Energy consumption of vending machines

Consommation d'énergie des distributeurs automatiques

Energieverbrauch von Verkaufsautomaten

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
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European foreword

This document (EN 50597:2018) was prepared by CLC/TC 59X, "Performance of household and similar electrical appliances", WG11, "Power consumption of vending machines".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2019-05-30
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2021-11-30

This document supersedes EN 50597:2015.

EN 50597:2018 includes the following significant technical changes with respect to EN 50597:2015:

The ambient test conditions have been harmonised with those in other related standards. The order of tests has been modified to make the testing less time consuming and more efficient. This revised standard includes an extra category of machine: one divided vertically into two compartments each with different functions.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

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

Introduction

Vending machines are included in the European Commission's eco-design study on ENER Lot 12. It is foreseen that an Ecodesign Regulation implementing Directive 2009/125/EC on the eco-design of energy-related products will be adopted in the future, and a corresponding standardization request will be issued to CEN and CENELEC accordingly. The development of the present European Standard was deemed necessary in order to anticipate the above-mentioned developments.

1 Scope

This document defines methods for the measurement of energy consumption of vending machines, whether or not fitted with refrigerating appliances.

The standard applies (but is not limited) to the categories shown in Table 1 of machine types.

Table 1 — Vending machine categories

CATEGORY	MACHINE TYPE
1	Refrigerated closed fronted can and bottle machines where the products are held in stacks
2	Refrigerated glass fronted can and bottle, confectionery & snack machines
3	Refrigerated glass fronted machines entirely for perishable foodstuffs
4	Refrigerated dual-temperature glass fronted machines
5	Confectionery and snack machines that are not refrigerated
6	Combination machines consisting of two different categories of machine in the same housing and powered by one chiller

The following types of vending machine are excluded from this standard:

— drink machines dispensing hot and/or cold drinks into cups;

— machines with a food heating function;

— vending machines operating at temperatures below 0 °C; or

— any machine including one or more of these compartments.

For verification purposes, it is essential to apply all of the tests specified to a single unit. The tests may also be made individually for the study of a particular characteristic.

This standard does not deal with any characteristics of machine design other than energy consumption.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 50564, *Electrical and electronic household and office equipment — Measurement of low power consumption*

EN 60335-1, *Household and similar electrical appliances — Safety — Part 1: General requirements (IEC 60335-1)*

EN 60335-2-75, *Household and similar electrical appliances — Safety — Part 2-75: Particular requirements for commercial dispensing appliances and vending machines (IEC 60335-2-75)*

ISO 5149-2, *Refrigerating systems and heat pumps — Safety and environmental requirements — Part 2: Design, construction, testing, marking and documentation*

ISO 5149-3, *Refrigerating systems and heat pumps — Safety and environmental requirements — Part 3: Installation site*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1 Terms relating specifically to the vending process

3.1.1
automatic defrosting
defrosting where no action is necessary by the user to initiate the removal of frost accumulation and to restore normal operation

Note 1 to entry: It includes the automatic removal of defrost water.

3.1.2
cabinet
enclosure within a vending machine in which product is held ready to be vended

3.1.3
automatic energy saving mode
mode of a vending machine in which energy reducing measures are automatically applied as a result of operational controls fitted by the manufacturer

Note 1 to entry: These could include light or movement sensors.

Note 2 to entry: Timers or other controls that can be adjusted by the machine operating company do not qualify as automatic unless they have a permanent minimum configuration level that cannot be overridden by the machine operating company, in which case they may be operational for the automatic energy saving mode test at their minimum configuration.

3.1.4
factory settings
settings that are made in the factory before the machine is sent to the customer, including but not limited to thermostat settings, defrost cycles and energy saving features

3.1.5
health control cut out function
machines intended entirely for the storage and vending of perishable foodstuffs or with a compartment for the storage and vending of such foodstuffs shall be fitted with a function that prevents vending of foodstuff if the machine or compartment experiences a time/temperature condition outside that permitted under food safety regulations

3.1.6
loading or filling
process of putting products into the vending machine

Note 1 to entry: This may require the door of the machine to be open.

3.1.7
manufacturer's instructions
instructions that accompany the machine, including advice on installation of the machine at the final operating location

3.1.8
non-refrigerated machines
vending machines with no refrigeration system fitted

Note 1 to entry: These may dispense a variety of products including but not limited to newspapers, non-perishable snacks and toys.

3.1.9
perishable foodstuffs
foods, such as dairy products, sandwiches and plated meals that are required to be kept chilled under food safety regulations

Note 1 to entry: Requirements vary between EU Member States.

3.1.10
pull down
reduction of temperature inside the product storage area of a chilled vending machine to the machine's nominal operating temperature as specified by the manufacturer

Note 1 to entry: For example, as required following the loading operation.

3.1.11
ready mode
mode of a vending machine in which the machine is available (ready) for use but no products are taken. In this mode vended products are available for immediate delivery

3.1.12
refrigerated dual temperature glass fronted machines
machines which can be set up to have more than one compartment, each of which is held at a different temperature, one of which is for perishable food

Note 1 to entry: The presence of a health control cut-out function in the perishable food compartment is essential.

Note 2 to entry: The compartments in these machines are sized according to the needs of the final customer. In practice, they are operated with no more than 50 % capacity at perishable food temperatures.

Note 3 to entry: If the machine includes a food safety thermal cut-out functionality, then for the purposes of testing, that compartment with the safety cut-out is deemed for storage of perishable foodstuff.

3.1.13
vending machine entirely for perishable foodstuffs
machine designed for the safe storage of perishable foods that meet the necessary regulatory requirements

Note 1 to entry: Presence of a health control cut-out function is an essential part of that requirement.

3.1.14
vending mode
transient mode of a vending machine during which products are dispensed

3.1.15
zone cooled vending machine
vending machines for which the cabinet is not fully cooled throughout its volume and in which product is cooled to the final vending temperature only as it reaches close to the dispensing mechanism (this is the usual configuration for category 1 machines)

Note 1 to entry: Zone cooled machines are not appropriate for perishable foodstuffs.

3.2 Relating to the tests

3.2.1
M-can
test can used to simulate a product during tests, fitted with a temperature measuring device

3.2.2
net volume
net internal refrigerated volume of the cabinet within which the products directly available for vending are contained, measured according to 6.4

3.2.3
normal conditions of use
operating conditions which exist when the **cabinet** is in service with all permanently located accessories, set up and situated as stated in the manufacturer's instructions / technical documentation

Note 1 to entry: The effects of actions by non-technical personnel for purposes of loading, unloading, cleaning, defrosting, the manipulation of accessible controls and any removable accessories, etc., according to the **manufacturer's instructions** are within this definition. The effects of actions resulting from interventions by technical personnel for the purposes of maintenance or repair are outside this definition.

3.2.4
test package
food product used as load when testing chilled food compartments

Note 1 to entry: The test packages used in these tests shall be commercially available, unopened, 330 ml cans of drinks. The difference in heat capacity of different drinks is insignificant.

4 General requirements

4.1 Applicability

This European Standard establishes the tests and calculations necessary to determine the energy rating of a vending machine.

The standard relates to the categories of vending machines described in Table 2 and to any combination of them.

Table 2 — Description of vending machine categories

CATEGORY	MACHINE TYPE	COMMENT
1	Refrigerated closed fronted can and bottle machines where the products are held in stacks	These machines serve refrigerated beverages that are not visible before vending.
2	Refrigerated glass fronted can and bottle, confectionery & snack machines	These machines are for foodstuffs which are refrigerated for reasons not related to food safety
3	Refrigerated glass fronted machines entirely for perishable foodstuffs	These machines are refrigerated for food safety reasons and have a health control cut-out function
4	Refrigerated dual-temperature glass fronted machines	These machines have two compartments, each of which is held at a different temperature, one of which is for perishable food. The compartment containing perishable food shall be controlled by a health control cut-out function.
5	Confectionery and snack machines that are not refrigerated	These machines store product at ambient temperature without cooling
6	Combination machines consisting of two different categories of machine in the same housing and powered by one chiller.	The machines usually consist of two machine modules separated by a vertical panel but could also be two units mounted one above the other. Typical combination machine would consist of a closed fronted bottle machine and a glass fronted snack machine, or two separate food and snack machines.

The machine manufacturer shall provide adequate information to confirm that the machine is suitable for testing according to this specification and that it can perform the tests as required, if necessary with minimum intervention by manufacturers' technical staff.

Information shall be provided by completing the test report in Annex B.

4.2 Test room

Tests shall be carried out in a test room at climate class 3, (25 ± 1) °C and (60 ± 5) % relative humidity with defined air movement. The conditions in the test room shall be measured by a probe located 500 mm upstream of the vending machine (on the air supply side of the cabinet) in line with the front of the cabinet and at half the height of the vending machine being tested.

Lighting shall be installed to maintain (600 ± 100) lx measured at a height of 1 m above the floor level.

Air movement shall be provided. The air movement shall be, as far as practicable, parallel to the plane of the cabinet opening and to the horizontal axis. The air velocity at any point on the vertical side of the vending machine shall be between 0,1 m/s and 0,2 m/s.

The direction of air flow shall be such that the air does not enter the cabinet when the door is open.

4.3 Instruments, measuring equipment and measuring accuracy

All measurement shall be carried out with instruments that have been calibrated.

Temperature measurements shall be made to an accuracy of ±1 °C. The time interval between temperature measurements should be no greater than 1 min.

Time measurements shall be made to the nearest [0,01] hours.

Relative humidity shall be measured to an accuracy of ± 5 %.

Electrical energy consumption shall be measured to a resolution of ± 0,01 kWh and with an accuracy of ± 1 %.

NOTE See EN 50564 for guidance on power measurement.