SLOVENSKI STANDARD
SIST EN 50193:1998

01-januar-1998

Closed electrical instaneous water heaters - Methods for measuring performance

Closed electrical instantaneous water heaters - Methods for measuring performance

Geschlossene Elektro-Durchfluß-Wassererwärmer - Prüfverfahren zur Bestimmung der Gebrauchseigenschaften

Chauffe-eau électriques instantanés fermés - Méthodes de mesures de l'aptitude à la fonction

Ta slovenski standard je istoveten z: EN 50193:1997

ICS:

91.140.65	Oprema za ogrevanje vode	Water heating equipment
97.100.10	Električni grelniki	Electric heaters

SIST EN 50193:1998 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50193

February 1997

ICS 91.140.60

Descriptors: Household electrical appliances, instantaneous water heaters, performance, characteristics, measurements

English version

Closed electrical instantaneous water heaters
Methods for measuring performance

Chauffe-eau électriques instantanés fermés - Méthodes de mesures de l'aptitude à la fonction

Geschlossene Elektro-Durchfluß-Wassererwärmer Prüfverfahren zur Bestimmung der Gebrauchseigenschaften

This European Standard was approved by CENELEC on 1996-12-09. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

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 Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Ref. No. EN 50193:1997 E

Foreword

This European Standard was prepared by the German national committee under supervision of the Technical Committee CENELEC TC 59X, Consumer information related to household electrical appliances.

It describes test methods for checking the performance of hydraulic, closed electrical instantaneous water heaters for household use and other criteria which are of particular importance for the consumer. For the time being it does not deal with the measuring of energy consumption.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50193 on 1996-12-09.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1997-12-01
- latest date by which national standards conflicting with the EN have to be withdrawn (dow) 1997-12-01

Annexes designated "normative" are part of the body of the standard.
In this standard, annex A is normative.

Contents

1 Scope

This standard applies to hydraulic, closed electrical instantaneous water heaters, for household and similar use.

This standard does not apply to storage water heaters (HD 500 S1) and to instantaneous water heaters with electronically controlled power input.

This standard specifies definitions and measurement methods for assessing the performance characteristics. It does not deal with safety requirements which are covered by EN 60335-2-35.

NOTE: Test methods for open outlet and electronically controlled instantaneous water heaters are under consideration.

2 Definitions

For the purpose of this European Standard, the following definitions apply:

2.1 *Terms used to designate the appliances*

2.1.1 instantaneous water heater: An appliance intended for heating water while it flows through the appliance.

2.1.2 closed instantaneous water heater: A water heater designed to operate under the pressure of the water supply mains, the flow of water being controlled by one or more valves in the outlet pipe.

2.1.3 hydraulic instantaneous water heater: A water heater, the energy supply of which is controlled by a flow switch.

2.1.4 bare-element instantaneous water heater: A water heater in which uninsulated heating elements are immersed in water.

2.1.5 sheathed-element instantaneous water heater: A water heater in which heating elements are insulated from the water by means of a refractory material contained in a metal sheath.

2.2 *Terms used to designate the characteristics of appliances*

2.2.1 flow switch: A switch which is operated by fluid flow, for example caused by a pressure difference.

2.2.2 minimum flow pressure: The necessary minimum static pressure in the water inlet pipe to the appliance, at which, while the water flows, the max. rated power input switches on and remains switched on.

NOTE: If the consumer has the possibility to adjust the temperature of the warm water or the power input it is necessary to determine the minimum flow pressure needed at the maximum rated power input.

2.2.3 water-flow rate: The amount of hot water flowing at the minimum flow pressure, the maximum rated power input being switched on.

2.2.4 rated power input [EN 60335-1:1994]**:** Power input assigned to the appliance by the manufacturer.

2.2.5 rated voltage [EN 60335-1:1994]**:** Voltage assigned to the appliance by the manufacturer.

NOTE: For three-phase supply it is the voltage between phases.

2.2.6 rated frequency [EN 60335-1:1994]**:** Frequency assigned to the appliance by the manufacturer.

3 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 60335-1	1994	*Safety of household and similar electrical appliance* *Part 1: General requirements* (IEC 335-1:1991, modified)
EN 60335-2-35	1994	*Safety of household and similar electrical appliances* *Part 2: Particular requirements for instantaneous water heaters* (IEC 335-2-35:1991, modified)
HD 500 S1	1988	*Methods to be used for measuring energy consumption of thermal storage water heaters and for the purpose of informing the consumers of it* (IEC 379:1987, modified).
ISO 228	1982	*Type threads where pressure-tied joins are not made on the threads* *Part 1: Dimensions, tolerances and designation*
ISO 1043-1	1987	*Plastics - Symbols - Part 1: Basic polymers and their special characteristics*

4 External dimensions

The external dimensions are measured on the appliance as delivered and mounted according to the manufacturers instructions. Except for buttons, handles etc. of controlling devices which, if any, are to be specified separately, the external dimensions are determined by:

Height a: vertical dimension measured from the lower edge of the appliance to the upper edge of the top.
Width b: horizontal dimension between the sides, as measured between two parallel vertical planes against the sides of the appliance.
Depth c: Horizontal dimension as measured from a vertical rear plane against the appliance and the most prominent part of the front.

5 List of measurements

Performance is determined by carrying out the following measurements:

- Determination of the minimum flow pressure according to 7.3;
- Determination of the temperature rise of the water according to 7.4;
- Determination of the water-flow rate according to 7.4.

6 General conditions for measurements

All tests shall be in line with the manufacturer's instructions and, unless otherwise specified, shall be carried out with the appliance as delivered under the following conditions:

6.1 *Number of appliances to be tested*

The tests are made on a single appliance.

6.2 *Ambient temperature*

The ambient temperature shall be maintained at (20 ± 5) °C.

6.3 *Supply voltage and frequency*

The supply voltage shall be the rated voltage ± 1 %.

The supply frequency shall not differ by more than 1% from the rated frequency.

6.4 *Water supply*

The temperature of the water at the inlet shall be (15 ± 2) °C.

If the measurements are carried out with water temperatures outside the limits above, the actual temperatures shall be reported.

The dynamic pressure of the water supply at the water inlet shall be within the range indicated by the manufacturer and shall be reported.

6.5 *Mounting of the appliance*

The appliance is fixed to the wall according to manufacturer's instructions for mounting. The means for fixing, accompanying the appliance or recommended by the manufacturer, shall be used.

An appliance for building-in shall be built in according to the manufacturer's instructions.

6.6 *Connection to water supply*

The appliance is connected to the water supply system as recommended by the manufacturer.

NOTE: For simplification of the test and protection of the measuring equipment against water pressure all tests should be carried out with open water outlet (see figure 1).

7 Measurements of performance

7.1 *Measurement of the water temperature*

The temperatures of the water at the inlet and at the outlet are measured by means of thermocouples or comparable devices according to figure 1.

7.2 *Measurement of the water-flow*

The water-flow is measured at the inlet by a suitable measuring device according to figure 1.

7.3 *Determination of the minimum flow pressure*

The purpose of this test is to measure the minimum flow pressure required at the place of installation to ensure the proper functioning of the appliance.

For the determination of the minimum flow pressure the control devices for temperature or power input, if adjustable by the user, are set to a position switching on the maximum power.

With the pressure control valve (figure 1), the flow pressure shall be slowly increased until the rated power input of the appliance is switched on and remains continuously switched on.

If the instruction of the manufacturer for mounting includes information on e.g. removal of devices for limiting the water flow in case of low water pressure, the test is repeated after these devices are removed.

For both cases, if applicable, the lowest required flow pressure shall be determined and reported.

NOTE: Proper function means that the power of the appliance is switched on and continuously remains switched on.

7.4 *Temperature rise of the water and water-flow rate*

The purpose of this test is to measure the temperature rise of the water and the water-flow rate under standardized test conditions for assessing the suitability for the intended use

The appliance is operated with the minimum flow pressure determined according to 7.3 for both cases, if applicable.

The temperatures of the inflowing and the outflowing water are measured according to 7.1 and the water-flow is measured according to 7.2 over a period of 5 min.

The temperature rise is reported in K and the water-flow rate in l/min.

7.5 *Data to be reported*

- ambient temperature (°C) according to 6.2 with an accuracy of ± 1 K;
- voltage used during the tests according to 6.3 with an accuracy of ± 1 V;
- frequency used during the tests according to 6.3 with an accuracy of ± 1 %;
- temperatures of the water inlet and outlet (°C) measured according to 7.1 with an accuracy of ± 1 K;
- minimum flow pressure (MPa) measured according to 7.3 with an accuracy of ± 1 %;
- temperature rise of the water (K) measured according to 7.4 with an accuracy of ± 1 K;
- water-flow rate (l/min) measured according to 7.4. with an accuracy of ± 3 %;
- rated power input;
- actual power input with an accuracy of ± 1 %

8 Materials

Materials in contact with water shall be sufficiently resistant to corrosion.

NOTE 1: Materials sufficiently resistant to corrosion are e.g.: copper, stainless steel, steel enameled, chromium plated and plastic.

NOTE 2: Requirements on water quality are based on national regulations.

If the material used in the appliance needs a corrosion protection device this information shall be stated in the installation instructions.