SLOVENSKI STANDARD
SIST EN 50193-2-1:2016

01-julij-2016

Električni pretočni grelniki vode - 2-1. del: Metode za merjenje lastnosti - Večfunkcijski električni pretočni grelniki vode

Electric instantaneous water heaters - Part 2-1: Methods for measuring the performance - Multifunctional electric instantaneous water heaters

Elektro-Durchfluss-Wassererwärmer - Teil 2 1: Verfahren zur Messung der Gebrauchseigenschaften - Multifunktionelle Elektro-Durchfluss-Wassererwärmer

Chauffe-eau électriques instantanés - Partie 2-1: Méthodes de mesure de l'aptitude à la fonction - Chauffe-eau électriques instantanés multifonctions

Ta slovenski standard je istoveten z: **EN 50193-2-1:2016**

ICS:

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

SIST EN 50193-2-1:2016 **en,fr**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50193-2-1

May 2016

ICS 91.140.65

English Version

Electric instantaneous water heaters - Part 2-1: Methods for measuring the performance - Multifunctional electric instantaneous water heaters

Chauffe-eau électriques instantanés - Partie 2-1: Méthodes de mesure de l'aptitude à la fonction - Chauffe-eau électriques instantanés multifonctions

Elektro-Durchfluss-Wassererwärmer - Teil 2 1: Verfahren zur Messung der Gebrauchseigenschaften - Multifunktionelle Elektro-Durchfluss-Wassererwärmer

This European Standard was approved by CENELEC on 2016-03-28. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 50193-2-1:2016 E

Contents

Page

European foreword

This document (EN 50193-2-1:2016) has been prepared by CLC/TC 59X "Performance of household and similar electrical appliances".

The following dates are proposed:

• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2017-03-28
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2019-03-28

This document is to be read in conjunction with EN 50193-1:2013.

Clauses, subclauses, notes, tables and figures which are additional to those in EN 50193-1:2013 are numbered starting from 101.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZA and ZZB, which are integral parts of this document.

1 Scope

This clause of Part 1 is applicable with the following exception:

This European Standard applies to electrical instantaneous water heaters designed to operate as multifunctional appliances with electric rated power >2 kW.

This European Standard specifies tests for the assessment of the performance.

2 Normative references

This clause of Part 1 is applicable with the following exception:

Addition:

EN 50193-1:2013, *Electric instantaneous water heaters - Part 1: General requirements*

3 Terms and definitions

This clause of Part 1 is applicable with the following exceptions:

Addition:

3.101
setpoint value
changeable value which is allocated to the appliance or the individual components thereof

3.102
flow pressure on activation of the heating capacity
pressure drop in the instantaneous water heater, at which the heating capacity is, and remains, activated

3.103
90% method
usually a physical value is reaching a final (average) value in an asymptotic manner. To reach a valid measurement result, a stop point of the measurement has to be defined. The measurement is stopped, if the value finally has reached 90% of the difference between (average) starting value and (average) final value

3.104
10%/90% method
usually a physical value is changing with a time delay in an asymptotic manner between starting value and final value. To reach a valid measurement result, a starting point and a stop point have to be defined for the measurement. The measurement is started, if the physical value has first reached 10% of the difference between (average) starting value and (average) final value. The measurement is stopped, if the value finally has reached 90% of the difference

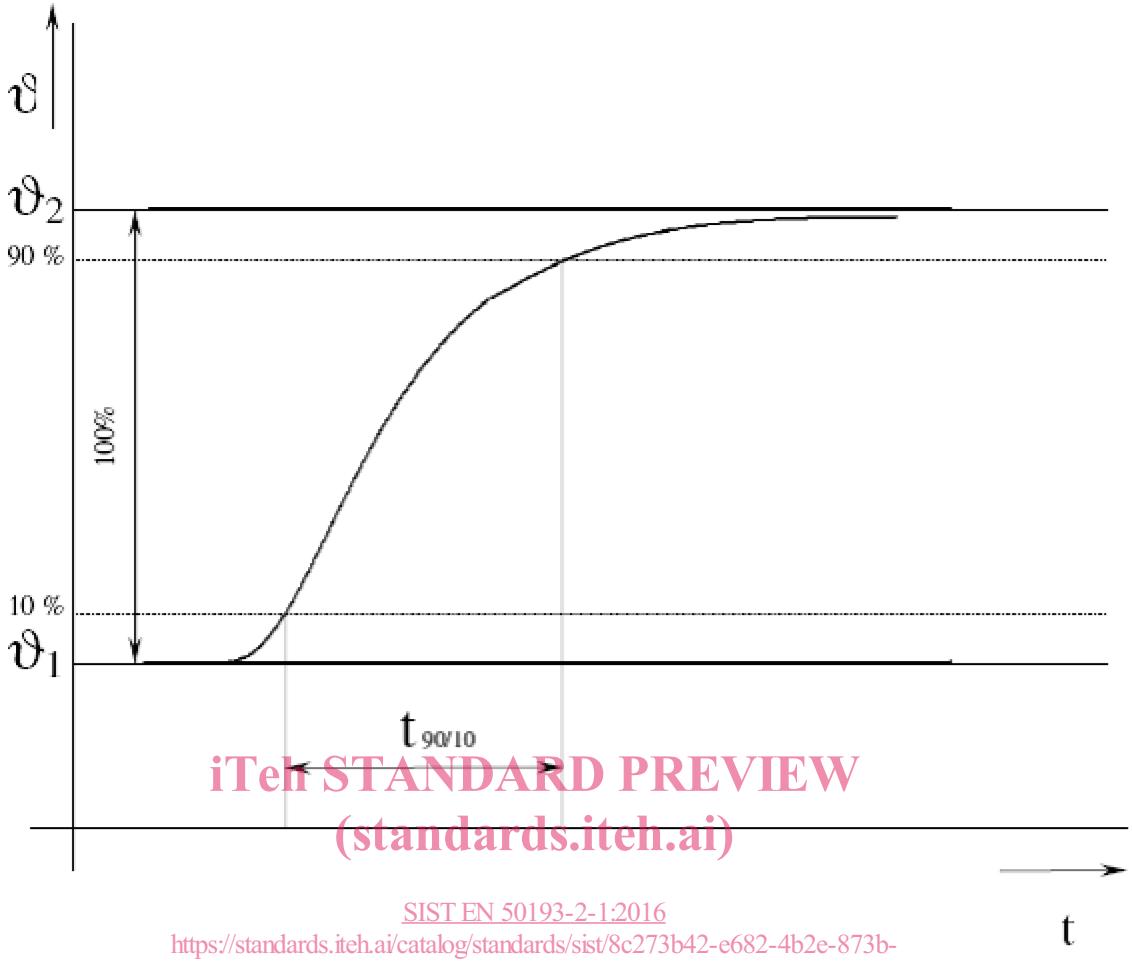

Figure 101

3.105
response time
time interval between the beginning of the changing of a value or parameter and the moment a steady state condition has obtained. The 90% method has to be used

3.106
volume flow rate/water flow rate
flow rate of water expressed in l/min

3.107
heating-up duration
time interval between the opening of the withdrawal device and the final outlet temperature is obtained. The 90% method has to be used for

3.108
pressure difference
difference between pressure at water inlet and water outlet of the appliance at a defined flow rate

After Clause 3, add the following new clause:

101 Symbols and units

For the purposes of this document, the following symbols and units apply.

Table 101 – Symbols and units

Symbol	Unit	Explanation
T_{min}	°C	The minimum setting of the temperature setting mechanism settable by user at which the appliance does heat. If no user accessible temperature selector is available, the relevant measurements with T_{min} are not performed.
T_{38}	°C	Standard hot water temperature set point for various tests: 38°C. If the temperature setting mechanism settable by user does not permit an outlet temperature setting of 38 °C, a temperature as close as possible above 38°C as possible shall be chosen. This temperature shall be stated in the test report and shall be used for any further measurements, instead of 38 °C. The positions of the temperature setting mechanism shall be marked for reproducible settings, taking into consideration the fact that T_{38} settings may dependent on the direction of the rotation of a knob. If no user accessible temperature selector is available, the temperature factory setting is defined to be the T_{38}.setting.
T_{max}	°C	The maximum setting of the temperature setting mechanism settable by the user. If no user accessible temperature selector is available, the relevant measurements with T_{max} are not performed.
T_{pmin}	°C	Temperature at the minimum permanent setting of the power selector settable by user at which the appliance does heat. If no user accessible power selector is available, the relevant measurements with T_{pmin} are not performed.
T_{pmax}	°C	Temperature at the maximum permanent setting of the power selector settable by user. If no user accessible power selector is available, the temperature factory setting is defined to be the T_{pmax} setting.
$\dot{V}_{90\%P}$.	ℓ/min	The flow-rate where the power consumption is 90% of rated power at T_{38} and an inlet-temperature of 15 °C
$K_{\dot{V}}$.	factor	The correction value for $\dot{V}_{90\%P}$ if the inlet temperature differs by more than 1K from 15 °C
T_m	°C	Temperature from which counting of useful energy content starts
T_p	°C	Minimum (peak) temperature to be achieved during tapping
T_{cold}	°C	Cold water inlet temperature
f	l/min	Minimum flow rate to be reached during tapping
P_{min}	kW	Minimum required instantaneous heating power to fulfil tapping
t_d	second	Tapping duration
P_{real}	kW	Minimum requited heating power of the appliance
P_{nom}	kW	Nominal heating power of the appliance
Q_{nom}	kWh	Nominal daily energy consumtion of the appliance
Q_r	kWh	Real daily energy consumtion of the appliance

4 General test conditions

This clause of Part 1 is applicable with following exceptions:

Modification:

The cold water temperature T_{cold} shall be 15 °C ± 5 K for the performance tests according to Clause 102ff.

4.4 Test setup

This subclause of Part 1 is not applicable.

Addition:

4.101 Time constants (measuring time)

Time constants shall be determined by means of the 10/90 % method.

4.102 Test setup

4.102.1 Measurement setup

The appliance shall be fixed in accordance with the installation instructions.

The measurement setup shall correspond to Figure B.101 for open-outlet appliances (single point) and to Figure B.102 for closed-outlet (multi point) appliances.

4.102.2 Set points

Unless no specific setpoints for the individual test are defined:

All non-user adjustable setpoints shall be adjusted according to manufacturer instructions for a standard setup.

User adjustable selectors have to be set as follows:

– If the appliance has a power selector, the selector shall be adjusted to the highest value.

– If the appliance has a temperature independent flow selector, it shall be adjusted to the highest value.

– If the appliance has a flow independent temperature selector, it shall be adjusted to the highest value.

– All other selectors shall be set according to manufacturer instructions.

4.102.3 Measurement of flow pressure and flow rate

Flow pressure and flow rate shall be measured in accordance to Annex B. Flow pressure shall be determined by measuring the pressure difference.

4.102.4 Temperature measurement

The inlet and outlet temperatures of the water shall be measured using the setup according to Annex B.

5 Energy efficiency

This clause of Part 1 is applicable.

Addition:

6.101 Performance tests

6.101.1 General

Smart Instantaneous water heater shall be measured as “Electronically controlled or regulated appliances” all other appliances are measured as “Hydraulically controlled appliances”.

6.101.2 Determination of flow rates

6.101.2.1 Introduction

The purpose of this test is to determine reference values for further measurements.

6.101.2.2 Electronically controlled or regulated appliances

The appliance is operated under the boundary conditions of EN 50193-1:2013, Table 1.

Set flow rate to $\dot{V}_{90\%P}$

– Closed outlet appliances: The water pressure difference shall be increased up to the half of the nominal pressure of the appliance, if necessary. If the flow rate $\dot{V}_{90\%P}$ cannot be obtained, the flow rate at pressure difference of half nominal pressure of the appliance is defined to be 100 %.

– Open outlet appliances: 0,1 MPa is the maximum useable pressure. If the flow rate $\dot{V}_{90\%P}$ cannot be obtained, the flow rate at a pressure difference of 0,1 MPa is defined to be 100 %

If the Inlet temperature deviates more than 1 K from 15 °C, a correction factor $K_{\dot{V}}$ has to be included:

$$K_{\dot{V}} = \frac{\vartheta_{in,real} - T_{38}}{15°C - T_{38}} .$$

The $\dot{V}_{90\%P}$ value will be corrected to

$\dot{V}_{90\%P} * K_{\dot{V}}$ ≙ 100%

Both, the outlet-temperature T_{38} and $\dot{V}_{90\%P}$ shall be stated in the test report and shall be used for any further measurements.

Table 102 – Nominal values for electronically controlled or regulated appliances

rated power	90% rated power	$T_{in,real}$	T_{38}	$\dot{V}_{90\%P}$.	$K_{\dot{V}}$.		$\dot{V}_{90\%P} * K_{\dot{V}}$ ≙ 100%
nominal pressure				pressure difference	Flow rate ≙ 100% [l/min]		

6.101.2.3 Hydraulically controlled appliances

The flow-rate shall be increased until the outlet temperature reaches the value of 38 °C. If this flow rate is not to be obtained, the water pressure shall be increased until the pressure difference has reached the half of the nominal pressure of the appliance. For single point appliances 0,1 MPa is the maximum pressure to be increased.

Nominal values have to be determined and recorded.

This value is taken to be 100 %.