
Kotli za gretje - Energijsko ocenjevanje hranilnikov tople vode - Dopolnilo A1

Heating boilers - Energy assessment of hot water storage tanks

Heizkessel - Energetische Bewertung von Warmwasserspeichern

Chaudières de chauffage - Évaluation énergétique des ballons d'eau chaude

Ta slovenski standard je istoveten z: EN 15332:2019/prA1

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ICS:

27.015	Energijska učinkovitost. Ohranjanje energije na splošno	Energy efficiency. Energy conservation in general
27.060.01	Gorilniki in grelniki vode na splošno	Burners and boilers in general
91.140.65	Oprema za ogrevanje vode	Water heating equipment

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ICS

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Heating boilers - Energy assessment of hot water storage tanks

Chaudières de chauffage - Évaluation énergétique des ballons d'eau chaude

Heizkessel - Energetische Bewertung von Warmwasserspeichern

This draft amendment is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 57.

This draft amendment A1, if approved, will modify the European Standard EN 15332:2019. If this draft becomes an amendment, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for inclusion of this amendment into the relevant national standard without any alteration.

This draft amendment was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN 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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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 15332:2019/prA1:2022) has been prepared by Technical Committee CEN/TC 57 “Central heating boilers”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

EN 15332 is revised to update it for:

- corrections of abbreviations, formulas and keys and
- corrections the standards body text and annexes

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

For relationship with EU Directive(s) / Regulation(s), see informative Annexes ZA and ZB, which are integral parts of this document.

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EN 15332:2019/prA1:2022 (E)

1 Modifications to Clause 3

Replace the terms and definitions after 3.5 with the following:

**3.6
storage temperature**

T_s
temperature of the storage tank measured at the thermostat position, which is intended for this purpose

**3.7
ambient temperature**

T_{amb}
temperature in the environment of the hot water storage tank measured according to 5.3.1

**3.8
storage excess temperature**

ΔT_x
temperature difference between the storage temperature and the ambient temperature:

$$\Delta T_x = T_{sm} - T_{amb}$$

**3.9
rated storage volume**

V_R
capacity of the storage tank assigned by the manufacturer, in litres

Note 1 to entry: Rated storage volume is the sum of the domestic water side volume, heating water and the volume in additionally heat exchangers e.g. solar systems.

**3.10
actual domestic storage volume**

V
capacity of the domestic water side of specific storage tank used during measurements and determined by volume measuring or balancing, in litres

Note 1 to entry: The heat exchanger(s) is/are empty.

**3.11
hot water volume**

V_u
quantity of hot water, in litre, at usable temperature T_u which is tapped during a specific time from the charged storage tank

**3.12
standing heat loss**

Q_B
energy loss, in kWh/d, at 65 °C against environment with an ambient temperature of $T_{amb} = 20$ °C, but at least 45 K excess temperature

**3.13
cycle time**

Δt
time interval of the data acquisition, in seconds

3.14**nominal storage temperature** T_{sn}

temperature of the stored water in the tank as measured by the thermostat

3.15**primary heating buffer tank**

storage tank that is only filled with primary water

3.16**buffer tank**

heat store filled with water, in which the contents do not come into contact with the atmosphere and which can collect energy from various sources, store it, and deliver it at a later point in time

2 Modifications to Clause 4

Replace 4.1 with the following:

4.1 Environment

The ambient temperature shall be (20 ± 3) °C. The air speed where the ambient temperature is measured (see Figure 3) shall not exceed 0,25 m/s and test room conditions shall be such that condensation is avoided.

The storage tank shall be protected from radiation from the environment.

Replace 4.2 with the following:

4.2 Measuring accuracy**4.2.1 Temperature**

Temperatures shall be measured within an accuracy of ± 1 K. It shall be guaranteed by appropriate installation of the temperature probes that on the measuring points the medium caloric temperature of the water is measured. The time constant for the temperature measurement shall not be larger than 5 s.

4.2.2 Mass and volume flow

The mass and volume flow of the water shall be measured within an accuracy of 1 %.

4.2.3 Time

The time shall be measured within an accuracy of ± 1 s.

4.2.4 Electrical energy

Electrical energy shall be measured with a measurement instrument with a range appropriate to the tank being assessed, the accuracy shall be 1 %.

4.2.5 Measurement cycle time

The cycle time for the measurement after 5.4 shall not be larger than 10 s.

For all other measurements according to Clause 5 the cycle time should not be larger than 60 s.

4.2.6 Volume

The actual storage volume of the storage tank shall be measured within an accuracy of ± 1 %.

EN 15332:2019/prA1:2022 (E)**3 Modifications to Clause 5**

Replace 5.1 and 5.2 with the following

5.1 General

The delivered storage tank shall be installed in accordance with the manufacturer's instructions and shall be tested as produced by the manufacturer.

Modifications may be implemented to adapt the storage tank to the test to be performed according to this document.

For storage tanks in a product range which have the same constructional design, the testing of only the smallest and the largest storage tank shall be sufficient, provided the ratio of the nominal volume of the smallest to largest storage tank is less than or equal to 2:1. If, however, within the same product range, this ratio is larger than 2: 1, then so many intermediate sizes shall be tested so that the ratio of 2: 1 from the higher volume size to the lower volume size is not exceeded.

The manufacturer shall ensure that all storage tanks of a product range, even those which have not been tested, conform to the requirements of this standard. The results of non-tested storage tanks shall be determined by interpolation based on the nominal volume.

If the models of a range are not using the same insulation, e.g. for the usage of vacuum insulation panels (VIP) then results of additional simulation tools can be used. The values obtained by the simulations shall be demonstrated by comparative measurements. The end results shall fulfil the required tolerances (max. 5 %).

NOTE The standing heat loss (S) and the volume (V) as defined below are used to establish the parameters needed for the eco-design and labelling regulations. For further information see also Annex ZA and ZB.

5.2 Connection of the storage tank

The connection to the heating source is done as indicated in the description by the manufacturer.

Furthermore, for the purposes of testing, if there is no means of heating the lower 15 % of the storage volume an additional heater shall be fitted in the tank provided for testing. In any case the criteria $T5 \geq (T4 - 10 \text{ K})$ shall be met; see 5.3.1.

In 5.3.1, replace the key of Figure 1 with the following:

Key

T1, T2, and T3	Ambient temperature around the storage tank
T4	Water temperature sensor at the top of the storage tank
T5	Water temperature sensor at bottom of the storage tank
H	Height of the storage tank itself
h	Distance given by height of the euro pallet $\geq 144\text{mm}$
1	Inlet valve (cold water)
2	Outlet valve (hot water)

In 5.3.1, replace all the paragraphs after Figure 1 until Figure 2 with the following:

The water temperature shall be measured at the top and at the bottom of the storage tank. The positioning of the upper temperature sensor (T4) is not more than 25 mm below the hot water draw off point (see Figure 2). The positioning of the lower temperature sensor (T5) is not more than 25mm above the bottom of the storage tank.

Start to heat up the tank and when the temperatures at $T4 = T_{sn}$ and $T5 \geq (T4 - 15 \text{ K})$ are reached then the 24 h stabilization period begins.

The standing heat loss measurement starts after the first shut off of the thermostat after the stabilization period.

The nominal temperature (T_{sn}) of the water storage tank measured at T4 shall be (65 ± 3) °C or at least 45 K above ambient temperature. The switching difference (hysteresis) on the controller shall not exceed ± 1 °C. This may require an electronic thermostat that either uses the same temperature sensor or an additional temperature sensor located in the immediate vicinity.

The standing heat loss corresponds to the electrical energy consumption in the steady-state condition.

In 5.3.2, replace the first paragraph with the following

Position the tank on a euro pallet (according to EN 13698-1 or a similar arrangement that raises the tank off the floor by (≥ 144) mm). A board of adequate strength with closed surface (e.g. MDF, hardboard, chip wood) is placed between the euro pallet and storage tank. The hardboard shall be at least of the dimensions of the insulated storage tanks. No isolation between the floor and the euro pallet/board is allowed. The distance from the test object to the wall shall be at least 700 mm. The distance to the ceiling shall be at least 250 mm.

In 5.3.2, replace Table 1 and the paragraph below Table 1 with the following

Table 1 — Thickness of insulation according to size of pipe or connection

Inner diameter	Thickness of insulation
≤ 22 mm	20 mm
> 22 mm ≤ 35 mm	30 mm
> 35 mm ≤ 100 mm	Equal to inner diameter
> 100 mm	100 mm

Wall mounted storage tanks shall be hung on a separate wall which is at least 150 mm from the room wall with the delivered mounting kit. The free space below and above the storage tank shall be at least 250 mm.

NOTE The separate wall can be realized with a board of adequate strength with closed surface (e.g. MDF, hardboard, chipboard) without insulation.

Replace 5.3.3 including Figure 3 with the following

5.3.3 Execution of the measurement

The consumption of electrical energy E_1 within time period t_2 to t_3 and the consumption of electrical energy E_2 within time period t_3 to t_4 shall be measured after reaching the steady-state condition, see Figure 3. The difference of the electrical energy E_1 between the two periods shall not be greater than 3 %. The value to be declared is the average of the two valid measurements.

The test remains on for at least two consecutive 24 h periods. Each 24 h period begins and ends with the switch off (first switch off after 24 h) of the temperature controller.

The steady- state condition shall be considered as reached, when conditions a) and b) are satisfied:

- the average storage temperature T_{sm} measured at sensor T4 does not vary by more than $\pm 2,5$ °C;
- the bottom temperature measured at sensor T5 does not vary by more than ± 3 °C.

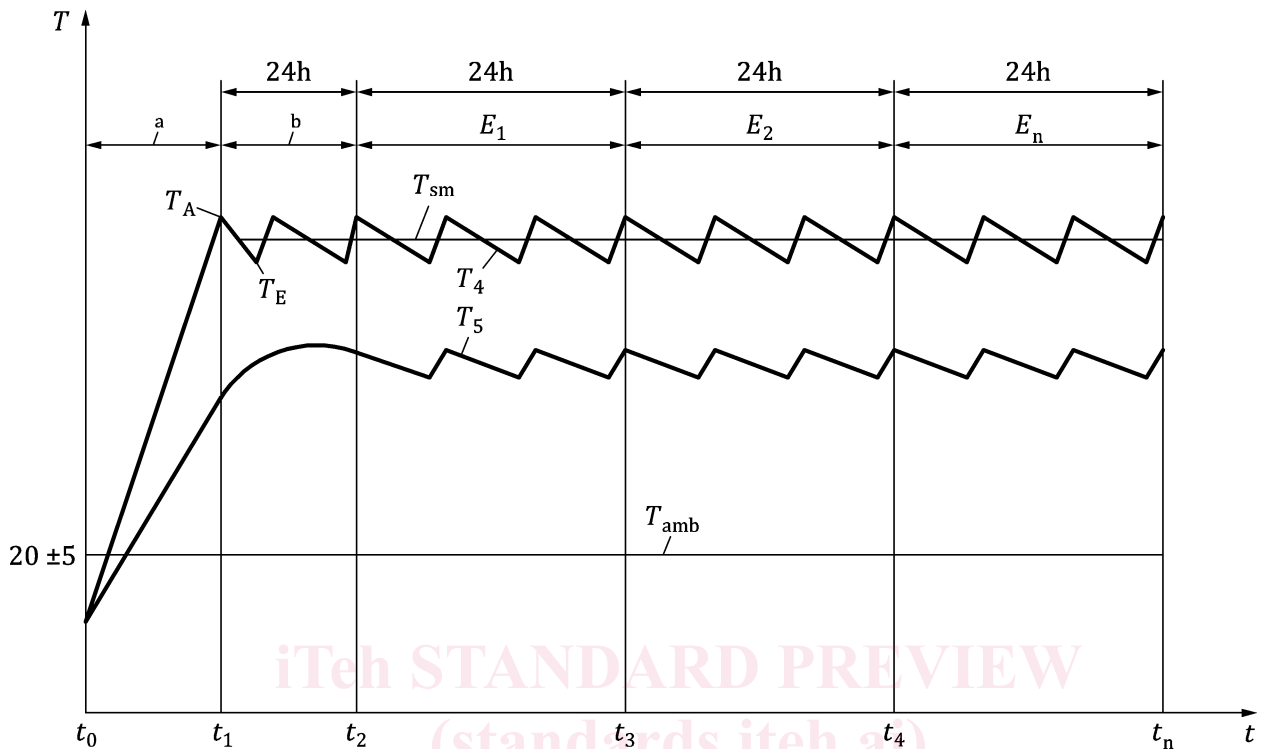
Compliance with the following temperatures during the measurement shall be given.

— $T_{amb} = 20 \pm 3$ K

— $T_4 = 65 \pm 3$ K

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- $T_4 - T_{amb} \geq 45 \text{ K}$
- $T_5 \geq (T_4 - 15 \text{ K})$

**Key**

- T temperature in °C
t time in h
TE temperature at turn on of the thermostat
TA temperature at shut off of the thermostat
t0 Start of the heat up period
t1 End of the heat-up period
t2 End of stabilization and start of heat loss measurement 1
t3 End of heat loss measurement 1 and start of heat loss measurement 2
t4 End of heat loss measurement 2
tn End of heat loss measurement n
a Heat up period
b Stabilization period
T4 = 65 °C ± 3 K
T5 ≥ (T4 - 15 K)
Tamb = 20 °C ± 3 K
Tsm Average storage temperature calculated from measurements taken at sensor T4 (°C)
E1 Average energy consumption
E2 Corrected energy consumption [kWh/d]
En Corrected energy consumption [kWh/d]

Figure 3 — Time diagram of the measurement