



# SLOVENSKI STANDARD SIST EN 15332:2020

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SIST EN 15332:2008

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## Kotli za gretje - Energijsko ocenjevanje hranilnikov tople vode

Heating boilers - Energy assessment of hot water storage tanks

Heizkessel - Energetische Bewertung von Warmwasserspeichern

Chaudières de chauffage - Évaluation de la performance énergétique des préparateurs d'eau chaude

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EN 15332:2019

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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

**SIST EN 15332:2020**

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EUROPEAN STANDARD

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English Version

## 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 European Standard was approved by CEN on 9 September 2019.

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

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## European foreword

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

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2020, and conflicting national standards shall be withdrawn at the latest by April 2020.

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

This document supersedes EN 15332:2007.

EN 15332:2019 includes the following significant technical changes with respect to EN 15332:2007:

- Scope was updated
- Normative references were updated
- Terms and definitions were updated
- Evaluation of energy efficiency was introduced
- The measurement section was made more concise
- Addition of Annex ZA

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

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

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

**EN 15332:2019 (E)****1 Scope**

This document specifies a method for the energy assessment of domestic/sanitary hot water storage tanks of up to 2 000 l.

Whilst this document does not cover water heaters intended primarily for direct heating, it does allow the provision of electric heating elements for auxiliary use.

Primary heating buffer tanks are not covered by this document. Heat losses of domestic hot water storage tanks integrated into combi boilers marketed as a single unit are not covered by this document.

**2 Normative references**

There are no normative references in this document.

**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 <https://www.iso.org/obp>

**3.1 indirectly heated un-vented hot water storage tanks**  
**indirectly heated closed hot water storage tanks**  
 storage vessels used for heating up domestic hot water with an external heat source where the hot water side is not permanently vented to the atmosphere, including all devices delivered with it

**3.2 domestic water side**  
 potable water side  
 side of the storage tank which contains domestic hot water

Note 1 to entry: If a mixing valve is delivered with the storage tank, it is considered to be part of the hot water side.

**3.3 heating side**  
 side of the storage tank which contains the heating medium

**3.4 temperature of the cold water**  
 $T_c$   
 temperature at the inlet of the domestic water side of the storage tank, in °C

**3.5 temperature of the warm water**  
 $T_w$   
 temperature at the outlet of the domestic water side, in °C

**3.6****usable hot water temperature** $T_u$ 

minimum temperature for the hot water to be usable

Note 1 to entry: Minimum temperature for the hot water defined here as difference between the temperature of the warm water  $T_w = 40$  °C minus the temperature of cold water  $T_c = 10$  °C ( $T_u = T_w - T_c = 30$  K).

**3.7****heating medium supply temperature** $T_h$ 

heating medium temperature at the entrance of the heating side of the water heater

**3.8****heating medium return temperature** $T_r$ 

heating medium temperature at the outlet of the heating side of the water heater

**3.9****storage temperature** $T_s$ 

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

**3.10****ambient temperature** $T_{amb}$ 

temperature in the environment of the hot water storage tank measured according to 5.3.1

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**3.11****storage excess temperature** $\Delta T_x$ 

temperature difference between the storage temperature and the ambient temperature:

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

**3.12****tapping volume flow** $V_w$ 

flow of warm water through the domestic water side, in l/s

**3.13****tapping mass flow** $m_w$ 

flow of warm water through the domestic water side, in kg/h

**3.14****loading mass flow** $m_l$ 

flow of heating medium through the heating side, in kg/h

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**EN 15332:2019 (E)****3.15****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.

**3.16****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.

**3.17****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**3.18****continuous heat exchanger input** $P_e$ continuous transferable heat power from the heating side to the hot water side, in kW, at standard conditions of  $T_c = 10\text{ °C}$ ,  $T_w = 60\text{ °C}$  and  $T_h = 80\text{ °C}$ 

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**3.19****standing heat loss** $Q_B$ energy loss, in kWh/d, at 65 °C against environment with an ambient temperature of  $T_{amb} = 20\text{ °C}$ , but at least 45 K excess temperature**3.20****cycle time** $\Delta t$ 

time interval of the data acquisition, in seconds

**3.21****nominal storage temperature** $T_{sn}$ 

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

**3.22****primary heating buffer tank**

storage tank that is only filled with primary water

**3.23****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



## 4 Requirements on the test rig

### 4.1 Environment

The ambient temperature shall be  $(20 \pm 3)$  °C. The air speed where the ambient temperature is measured (see Figure 3) shall not exceed 0,25 m/s.

The relative humidity shall be lower than 85 %.

The water heater shall be protected from radiation from the environment.

The cold water temperature  $T_c$  shall be between 8 °C and 18 °C and shall not vary more than  $\pm 1$  K during the test.

If the cold water temperature differs from the given temperature range, the measurement shall take place with the according temperature differences.

### 4.2 Measuring accuracy

#### 4.2.1 Temperature

Temperatures shall be measured with a minimum accuracy of  $\pm 1$  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 with minimum accuracy of 1 %.

#### 4.2.3 Time

The time shall be measured with a minimum accuracy of  $\pm 1$  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 minimum accuracy shall be 1 % or a maximum bandwidth of  $\pm 10$  Wh.

#### 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  $\pm 1$  %.

## 5 Measurements

### 5.1 General

The delivered storage tank, as produced by the manufacturer, shall be tested.

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.