BS EN 12897:2016+A1:2020

BSI Standards Publication

Water supply – Specification for indirectly heated unvented (closed) storage water heaters

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National foreword

This British Standard is the UK implementation of EN 12897:2016+A1:2020. It supersedes BS EN 12897:2016, which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CEN text carry the number of the CEN amendment. For example, text altered by CEN amendment A1 is indicated by ▌A1⟩ ⟨A1▌.

The UK participation in its preparation was entrusted to Technical Committee B/504/-/10, Hot & Cold Water Storage.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 12897:2016+A1

February 2020

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English Version

Water supply - Specification for indirectly heated unvented (closed) storage water heaters

Alimentation en eau - Prescriptions pour préparateurs d'eau chaude par accumulation à chauffage indirect non ouverts à l'air libre (fermés)

Wasserversorgung - Bestimmung für mittelbar beheizte, unbelüftete (geschlossene) Speicher-Wassererwärmer

This amendment A1 modifies the European Standard EN 12897:2016; it was approved by CEN on 9 October 2019.

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European foreword

This document (EN 12897:2016+A1:2020) has been prepared by Technical Committee CEN/TC 164 “Water supply”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by August 2020, and conflicting national standards shall be withdrawn at the latest by August 2020.

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

This document includes Amendment 1 approved by CEN on 2019-10-09.

This document supersedes [A1⟩ EN 12897:2016 ⟨A1].

The start and finish of text introduced or altered by amendment is indicated in the text by tags [A1⟩ ⟨A1].

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 Commission Delegated Regulation (EU) No 812/2013 and Commission Regulation (EU) No 814/2013.

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

In comparison with EN 12897:2006, the following significant changes have been made:

— the capacity range extended from 1 000 l to 2 000 l;

— the maximum temperature reduced from 100 °C to 95 °C;

— revisions in durability testing for cylinders using expansion vessels or internal expansion space;

— provision is made in Annex A for the calculation of the V_{40} hot water capacity;

— Annex B has been revised to improve the test methodology and bring the standing heat loss test requirements in line with those required by the EU directives for the Ecodesign and labelling of hot water storage tanks.

[A1⟩ According to the CEN/CENELEC Internal Regulations, the national standards organizations 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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom. ⟨A1]

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Introduction

In respect of potential adverse effects on the quality of water intended for human consumption caused by the product covered by this standard:

a) This standard provides no information as to whether the product may be used without restriction in any of the Member States of the EU or EFTA.

b) It should be noted that, while awaiting the adoption of the verifiable European criteria, existing national regulations concerning the use and/or the characteristics of this product remain in force.

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1 Scope

This document specifies the constructional and performance requirements and methods of test for indirectly heated, unvented (closed) storage water heaters of up to 2 000 l volume suitable for connection to a water supply at a pressure between 0,05 MPa and 1,0 MPa (0,5 bar and 10 bar), and fitted with control and safety devices designed to prevent the temperature of the stored drinking water from reaching 95 °C.

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

2 Normative references

[A1] 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. [A1]

EN 1487, *Building valves — Hydraulic safety groups — Tests and requirements*

EN 1488, *Building valves — Expansion groups — Tests and requirements*

EN 1489, *Building valves — Pressure safety valves — Tests and requirements*

EN 1490, *Building valves — Combined temperature and pressure relief valves — Tests and requirements*

EN 1491, *Building valves — Expansion valves — Tests and requirements*

EN 1567, *Building valves — Water pressure reducing valves and combination water pressure reducing valves — Requirements and tests*

EN 1717, *Protection against pollution of potable water in water installations and general requirements of devices to prevent pollution by backflow*

EN 13203 (all parts), *Gas-fired domestic appliances producing hot water*

EN 13959, *Anti-pollution check valves — DN 6 to DN 250 inclusive family E, type A, B, C and D*

EN 15332:2007, *Heating boilers — Energy assessment of hot water storage systems*

EN 60379:2004, *Methods for measuring the performance of electric storage water-heaters for household purposes (IEC 60379:1987)*

EN 60730-2-9, *Automatic electrical controls for household and similar use — Part 2-9: Particular requirements for temperature sensing controls (IEC 60730-2-9)*

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3 Terms, definitions and symbols

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

A1 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 A1

3.1 Terms and definitions

3.1.1
indirectly heated unvented (closed) storage water heater
vessel complete with heat exchanger (primary heater) for heating and storage of drinking water where the contents are not vented to atmosphere

3.1.2
rated volume
rated storage volume
V
volume of the water storage vessel in litres as specified in the manual

3.1.3
actual volume
measured volume of the drinking water storage vessel in litres

3.1.4
water side
part of the storage water heater directly in contact with the drinking water

3.1.5
heating side
parts of the storage water heater which contain the heating medium

3.1.6
maximum design pressure
rated pressure
maximum pressure to which the unvented storage water heater is designed to be subjected in use

3.1.7
maximum inlet pressure
specified maximum cold water inlet pressure for the water heater

3.1.8
maximum safety temperature
maximum temperature that the stored water can reach under a fault condition

3.1.9
maximum operating temperature
maximum temperature that can be set for normal operation

3.1.10
primary heater
heat exchanger system fitted to the hot water storage vessel through which a heating medium (such as water from a boiler) flows to heat the stored drinking water

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3.1.11
double-walled primary heater
primary heater with concentric walls such that any leak through one wall will not allow the heating fluid to contaminate the drinking water

3.2 Symbols

Symbol	Unit	Description
θ'_p	[°C]	Average temperature of the water drawn off at ≥ (θ_c + 30) °C
V_{40}	[l]	Mixed water quantity delivered at 40 °C.
θ_c	[°C]	Average temperature of inlet cold water during the test
θ_{set}	[°C]	Target hot water temperature for hot water performance testing = θ_c + 50 K
θ_{pri}	[°C]	Primary flow temperature = θ_c + 70 K
θ_w	[°C]	Target temperature of stored water for heat loss testing
e	[°C]	Mean of all the differentials between θ_w and measured ambient air temperature
θ_a	[°C]	Measured ambient temperature at a given position
V_{hot}	[l]	Volume of water drawn off at ≥ (θ_c + 30)°C
Q_c	[kWh/24h]	Corrected 24 h heat loss
Q_{st}	[kWh/24h or W]	Declared standing heat loss
Q_m	[kWh]	Power consumption meter reading
t	[minutes]	Time taken to reheat the storage water heater from θ_c *to* θ_{set}
P	[kW]	Calculated heat exchanger performance

4 Requirements

4.1 Constructional requirements

4.1.1 Inspection access

Unvented storage water heaters shall be provided with means for internal inspection (see Annex C). This can also be achieved by using a connection intended and dimensioned for another purpose where the use of a suitable inspection instrument such as an endoscope is acceptable.

4.1.2 Draining

Unvented storage water heaters shall permit *in situ* draining. The method of draining shall be given in the manufacturer's instructions.

4.1.3 Hydraulic connections

Hydraulic connections shall be of a type that allows the storage water heater to be disconnected from the pipework.

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4.2 Temperature control

The temperature of the stored drinking water shall be regulated either by control of the heat source or sources or by control of the water heater.

4.3 Mechanical resistance and stability

4.3.1 Pressure resistance of water storage vessel

When tested in accordance with 6.2, the water heater shall withstand a pressure of 2,0 times the maximum design pressure (as specified by the manufacturer) for a period of not less than 10 min without showing any leakage or cracking.

4.3.2 Pressure resistance of primary heater

When tested in accordance with 6.2, the primary heater or heaters shall withstand a pressure of 2,0 times the maximum design pressure, as specified by the manufacturer, for a period of not less than 10 min without showing any leakage or cracking.

4.3.3 Durability

4.3.3.1 General

Water heaters shall be tested for durability by pressure cycle testing to either 4.3.3.2 or 4.3.3.3 as appropriate. See Figure 2 for details. The storage water heater shall show no signs of leakage or cracking after testing.

For water heaters without inlet pressure and system expansion control and where the internal pressure is likely to reach maximum design pressure due to water expansion after heat input, the test in 4.3.3.2 shall be applied.

For water heaters designed for use with expansion vessels or internal expansion space such that the rise in internal pressure due to expansion is controlled to below maximum design pressure, then the alternative 4.3.3.3 shall be used.

If 4.3.3.3 is used then the installation manual supplied with the water heater shall specify the pressure reduction and expansion control devices required.

4.3.3.2 Water heaters without inlet pressure and system expansion control

The water heater shall be subjected to either 20 000 periodic cycles at 1,2 × maximum design pressure or 100 000 periodic cycles at 1,0 × maximum design pressure.

4.3.3.3 Water heaters designed for use with expansion vessels or internal expansion space

For water heaters supplied for use with inlet pressure controls and expansion control systems and these control systems are supplied with the water heater then the water heater shall be subjected to either 20 000 periodic cycles at 1,5 × maximum inlet pressure or 100 000 periodic cycles at 1,3 × maximum inlet pressure. This procedure is illustrated by Figure 1.

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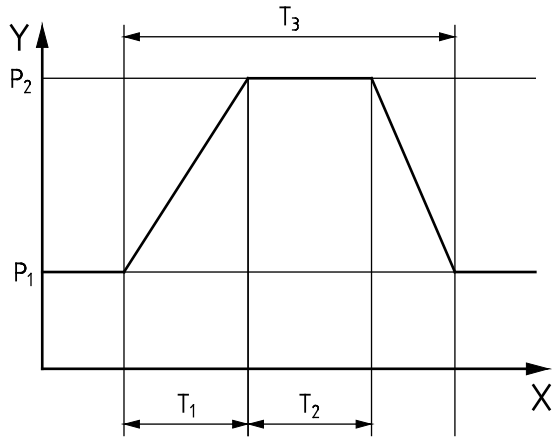


Key

Y pressure

X time

Figure 1 — Diagram of test pressure cycle variations

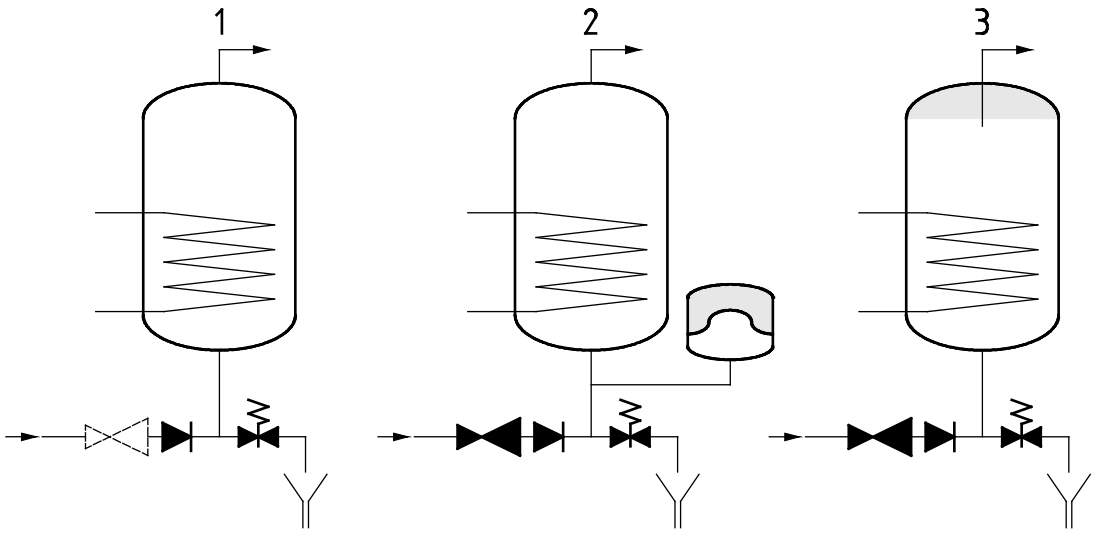
$T_1 \geq 15\ s \leq 30\ s$

$T_2 \geq 15\ s \leq 20\ s$

$T_3 \geq 45\ s \leq 60\ s$

P_1 = Minimum inlet pressure as defined in the technical documents or 0,1 MPa (1 bar) whichever is the lower value.

P_2 = Test pressure as defined in 4.3.3.2 or 4.3.3.3 as appropriate.



Key

1 optional inlet pressure control with expansion valve (4.3.3.2)

2 mandatory inlet pressure control with external expansion vessel (4.3.3.3)

3 mandatory inlet pressure control with internal expansion space (4.3.3.3)

Figure 2 — Pressure control options

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