

Contents

Page

European foreword.....	8
1 Scope.....	9
2 Normative references.....	9
3 Terms and definitions	12
4 Classification.....	28
4.1 Gases and appliance categories	28
4.2 Mode of air supply and evacuation of the combustion products	28
4.3 Water pressure	28
5 Constructional requirements	28
5.1 Conversion to different gases	28
5.1.1 General.....	28
5.1.2 Permissible operations for changing gases.....	29
5.2 Materials.....	29
5.2.1 General requirements related to the use of materials in water heaters	29
5.2.2 Materials in contact with water for human consumption	30
5.2.3 Durability against corrosion of combustion product evacuation duct.....	31
Table 1 — Metallic flue duct material specifications	32
5.2.4 Disassembly, recycling and disposal.....	32
5.2.5 Design - Assembly - Strength.....	33
5.2.6 Accessibility - Ease of maintenance - Fitting and removal.....	33
5.2.7 Connection to gas and water pipes	33
5.2.8 Soundness	34
5.2.9 Supply of combustion air and evacuation of the combustion products	35
5.2.10 Checking the state of operation	39
5.2.11 Drainage	39
5.2.12 Electrical and electromagnetic safety.....	39
5.2.13 Operational safety in the event of failure of the auxiliary energy.....	40
5.3 Adjusting, control and safety devices	41
5.3.1 General.....	41
5.3.2 Shut off valves and/or gas rate adjusters.....	41
5.3.3 Preset gas rate adjusters	42
5.3.4 Gas pressure regulator.....	43
5.3.5 Pressure test points.....	43
5.3.6 Automatic water-operated gas valve	43
5.3.7 Ignition devices.....	43
5.3.8 Flame supervision device.....	44
5.3.9 Atmosphere sensing device for type A _{AS} appliances	45
5.3.10 Combustion products discharge safety device for type B _{11BS} , B _{12BS} and B _{13BS} appliances	46
5.3.11 Protection against accidental overheating of thermostatic appliances.....	46
5.3.12 Composition of the gas circuit	46
5.3.13 Protection for appliances intended to be installed in a partially protected place	47
5.4 Main burner	47
5.5 Supplementary requirements for condensing water heaters	48
5.5.1 Materials in contact with condensate	48
5.5.2 Discharge of condensate.....	48
5.5.3 Control of the combustion products temperature	48
5.5.4 Chemical composition of the condensate	49

6	Operational requirements	49
6.1	General	49
6.1.1	Introduction.....	49
6.1.2	Characteristics of the test gases	49
6.1.3	Requirements for preparation of the test gases.....	49
6.1.4	Choice of test gases.....	49
6.1.5	Test pressures.....	49
6.1.6	General test conditions.....	49
6.2	Soundness.....	54
6.2.1	Soundness of the gas circuit.....	54
6.2.2	Soundness of the combustion circuit and evacuation of the combustion products	55
	Table 2 — Maximum admissible leakage rates.....	57
6.2.3	Soundness of the water circuit.....	61
6.3	Heat inputs.....	61
6.3.1	General	61
6.3.2	Nominal heat input.....	63
6.3.3	Minimum heat input.....	64
6.4	Temperature of the control knobs	64
6.4.1	Requirements.....	64
6.4.2	Test	64
6.5	Temperature of the adjusting, control and safety devices	64
6.5.1	Requirement.....	64
6.5.2	Test	64
6.6	Temperature of the appliance casing, the surface on which it is installed and adjacent surfaces and external temperature of the ducts	64
6.6.1	Requirements.....	64
6.6.2	Tests	65
6.7	Ignition - Cross-lighting - Flame stability.....	66
6.7.1	Operation in still air for all appliances	66
6.7.2	Supplementary tests for appliances of types A _{AS} and B ₁ except for B ₁₄	67
6.7.3	Supplementary tests for type C ₁₁ appliances and outdoors and/or partially protected appliances.....	68
6.7.4	Supplementary tests for type C ₂ appliances	70
6.7.5	Supplementary tests for appliances of types C ₁₂ , C ₁₃ , C ₃₂ , C ₃₃ , B ₄ and B ₅	70
6.7.6	Supplementary tests for type C ₄₂ and type C ₄₃ appliances.....	71
6.7.7	Supplementary tests for type C ₅₂ and type C ₅₃ appliances.....	71
6.7.8	Supplementary tests for type C ₆ appliances	71
6.7.9	Supplementary tests for type C ₇₂ and type C ₇₃ appliances.....	71
6.7.10	Supplementary tests for type C ₈₂ and type C ₈₃ appliances.....	71
6.7.11	Functioning of a permanent ignition burner when the fan stops during the standby time	72
6.7.12	Air proving device for fan assisted water heaters	72
6.7.13	Functioning of the fan of types C ₄₂ and C ₄₃ water heaters.....	75
6.7.14	Protection against the accumulation of gas in the combustion circuit for water heaters equipped with a fan	75
6.7.15	Leakage of combustion products from type C ₇ water heaters.....	76
6.7.16	Supplementary tests for type B ₁₄ , B ₂ and B ₃ water heaters.....	76
6.8	Adjusting, control and safety devices	77
6.8.1	General	77
6.8.2	Control devices	77
6.8.3	Closing mechanisms	77
6.8.4	Ignition devices	79

6.8.5	Safety times	80
6.8.6	Gas pressure regulator.....	82
6.8.7	Adjustment of the water rate - Maximum water temperature (all appliances)	83
6.8.8	Overheating of the water.....	83
6.8.9	Effectiveness of the protection against accidental overheating of thermostatic appliances.....	84
6.8.10	Atmosphere sensing device for type A _{AS} appliances	84
6.8.11	Combustion products discharge safety device of type B _{11BS} appliances.....	86
	Table 3 — Shutdown times in relation to blockage	87
6.9	Combustion	88
6.9.1	Requirements	88
6.9.2	Test.....	89
	Table 4 — Percentage of CO₂	89
6.9.3	Nitrogen oxides emissions.....	93
	Table 5 — Weighting factors	94
6.10	Soot deposition	95
6.10.1	Requirement	95
6.10.2	Test.....	95
6.11	Frost protection system for appliances intended to be installed in a partially protected place	96
6.12	Protection against ingress of rain for appliances intended to be installed in a partially protected place	96
6.13	Condensing water heaters	96
6.13.1	Formation of condensate.....	96
6.13.2	Temperature of combustion products	97
6.14	Electrical power measurements.....	97
6.14.1	General.....	97
6.14.2	Nominal and minimal conditions	97
6.14.3	Standby	98
6.15	Measurement of standby heat losses.....	98
7	Rational use of energy	98
7.1	General.....	98
7.2	Heat input of ignition burners.....	98
7.2.1	Requirement	98
7.2.2	Test.....	98
7.3	Efficiency	98
7.3.1	Requirement	98
7.3.2	Test.....	98
8	Fitness for purpose.....	100
8.1	General.....	100
8.2	Constructional characteristics	100
8.2.1	Preset water rate adjuster	100
8.2.2	Temperature selector and summer-winter switch.....	100
8.2.3	Designation and measurement of reference temperatures of flue systems.....	100
8.2.4	Mechanical resistance and stability of ducts, terminal and fitting pieces.....	101
8.3	Requirements for plastic in the combustion product evacuation ducts, terminals and fitting pieces for appliances	102
8.3.1	Thermal resistance.....	102
8.3.2	Materials.....	103
	Table 6 — Criteria for testing long-term resistance to thermal load	104

Table 7 — Exposure time in weeks at raised temperatures.....	104
Table 8 — Criteria for testing long-term resistance to condensate exposure.....	105
Table 9 — Composition of test condensate for corrosion	106
Table 10 — Criteria for testing resistance to condensing/ non- condensing cycling.....	106
8.4 Requirements for elastomeric seals and elastomeric sealants in the combustion product evacuation ducts, terminals and fitting pieces	108
8.4.1 Characterization	108
8.4.2 Long-term resistance to thermal load.....	109
Table 11 — Criteria for testing long-term resistance to thermal load	109
8.4.3 Long-term resistance to condensate exposure.....	109
Table 12 — Criteria for testing-long term resistance to condensate exposure	110
Table 13 — Condensate composition, related to construction classes	110
8.4.4 Cyclic condensate resistance test	110
8.4.5 Relaxation behaviour	111
8.4.6 Compression set.....	111
8.4.7 Low temperature resistance.....	111
8.4.8 Joints in elastomeric seals.....	112
8.5 Operational characteristics	112
8.5.1 Minimum heat input.....	112
8.5.2 Nominal and minimum useful outputs	112
8.5.3 Ignition of permanent ignition burners by a spark generator.....	112
8.5.4 Ignition opening time (T_{IA})	113
8.5.5 Automatic water-operated gas valve.....	113
8.5.6 Adjustment of the water rate - Water temperature	114
Table 14 — Maximum permitted deviation for the water rate in relation to the mean rate	115
8.5.7 Heating-up time.....	118
Table 15 — Water temperature conditions depending on the control mode of the appliance...	119
8.5.8 Specific rate	119
9 Marking and instructions	120
9.1 Water heater marking	120
9.1.1 Data plate.....	120
9.1.2 Markings related to the state of adjustment.....	121
9.1.3 Packaging.....	121
9.1.4 Warnings notices on the water heater and the packaging	122
9.1.5 Other information	123
9.2 Instructions.....	123
9.2.1 Instructions for installation.....	123
9.2.2 Instructions for use and servicing.....	129
9.2.3 Conversion instructions	131
9.3 Presentation	131
10 Nitrogen oxides emissions	132
11 Sound power level (L_{WA}).....	132
12 Figures referenced in this standard.....	133
Figure 1 — Apparatus for verifying soundness of the gas circuit (see 6.1.6.5, 6.2.1.3 and Annex E)	133

Figure 2 — Test of an appliance of types B₁₁ and B_{11BS} under abnormal draught conditions (see 6.7.2.2, test n° 1).....	134
Figure 3 — Probe for sampling the combustion products of appliances of types B₁₁ and B_{11BS} (see 6.9.2.1)	135
Figure 4 — Test of a type C₂ appliance mounted on the common duct (see 6.7.4.2)	136
Figure 5 — Position of the sampling points in the horizontal plane of the sealed room (see 6.8.10.1.2.1 and Annex D)	137
Figure 6 — Device for sampling the combustion products above the deflector for type A_{AS} appliances (see 6.8.10.2.1.2 and 6.9.2.1)	138
Figure 7 — Sampling probe for test flues of diameter equal to or greater than DN 100 (see 6.9.2.1)	139
Figure 8 — Sampling probe for test flues of diameter less than DN 100 (see 6.9.2.1)	140
Figure 9 — Probe for sampling and measuring the temperature of the combustion products (see 6.9.2.1)	141
Figure 10 — Location of the probe for type C appliances (see 6.9.2.1).....	142
Figure 11 — Combustion products discharge safety device for type B_{11BS} appliances (see 6.8.11.4.2.1 and 6.8.11.4.2.2).....	143
Figure 12 — Down-draught test for the type C₇ water heaters (see 6.7.9.2 and 6.9.2.4.10)	144
Annex A (informative) National situations	145
A.1 General.....	145
A.2 Gas connections in common use in the various countries	145
Table A.1 — Gas connections in common use	146
A.3 Flue pipe diameters in force in the various countries.....	148
Table A.2 — Flue pipe diameters marketed	148
Annex B (normative) Test apparatus for type C₁, C₃, B₄ and B₅ water heaters (see 6.7.3.2)	149
Figure B.1 — Test apparatus for type C₁, B₄ and B₅ water heaters fitted with a horizontal terminal installed on a vertical wall	149
Figure B.2 —Test apparatus for type C₁, B₄ and B₅ water heaters fitted with a horizontal terminal installed on an inclined wall.....	150
Figure B.3 —Test apparatus for type C₃, B₄ and B₅ water heaters fitted with a vertical terminal installed on a horizontal wall.....	151
Figure B.4 — Test apparatus for type C₃, B₄ and B₅ water heaters fitted with a vertical terminal installed on an inclined wall.....	152
Annex C (normative) Test apparatus for type C₂₁ appliances (see 6.7.4.2).....	153
Annex D (normative) Description of the sealed room for the tests of type A_{AS} appliances (see 6.8.10.1.2.1)	154
D.1 Configuration of the sealed room.....	154
D.2 Soundness of the room.....	154
D.3 Effectiveness of mixing.....	154
D.4 Equipment of the room	154

Annex E (informative) Soundness of the gas circuit test - Volumetric method (6.2.1)	155
E.1 Equipment.....	155
E.2 Test method.....	155
Annex F (informative) Principal symbols and abbreviations used	156
Annex G (informative) Guidelines for extension to other appliances categories	158
Annex H (normative) Lists of materials currently used for the construction of the gas water heaters.....	159
H.1 General	159
H.2 Special types of steel.....	159
Table H.1 — Special types of steel.....	159
H.3 Copper and copper alloys	159
Table H.2 — Copper and copper alloys	159
H.4 Plastic materials.....	160
Table H.3 — Examples of plastic materials	160
Annex I (normative) Test methods to determine the effects of to long-term thermal load, long-term condensate exposure, condensing/ non-condensing cycling and resistance to UV radiation.....	161
Annex J (informative) NO_x conversion calculation	162
Table J.1 — Conversion of the emission value of NO_x for first family gases.....	162
Table J.2 — Conversion of the NO_x emission value for second family gases	162
Table J.3 — Conversion of the NO_x emission value for third family gases.....	162
Table J.4 — Table of Ratio Gross/Net and Net/Gross for Gas Families 1, 2 and 3	163
Annex K (normative) Parts in copper or copper alloys	164
Table K.1 – Properties of parts in copper or copper alloys	164
Annex L (informative) Compilation of the test conditions for the various gas families	165
Table L.1 - First family	165
Table L.2 - Second family	165
Table L.3 - Third family	166
Annex M (informative) Alternative Method for the determination of the nominal heat input or the maximum and minimum heat input (according to 6.3.1) for appliances using a pneumatic gas/air ratio control system.....	167
Bibliography	168

European foreword

This document (EN 26:202) has been prepared by Technical Committee CEN/TC 48 “Domestic gas-fired water heaters”, 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 June 2024, and conflicting national standards shall be withdrawn at the latest by June 2024.

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 26:2015.

The main technical changes compared to EN 26:2015 are the following:

- New or generally reworded requirements:
 - Separation between requirements and test methods in to different clauses;
 - Moving common parts from EN 15502-1 series when relevant and applicable;

prEN 13203-2:2021 provides a means of conforming to the Commission Delegated Regulation (EU) No 812/2013 of 18 February 2013 supplementing Directive 2010/30/UE of the European Parliament and of the Council with regard to energy labelling of water heaters, hot water storage tanks and packages of water heaters and solar service, except on Sound power level (L_{WA}) covered by the present standard, see Clause 11.

prEN 13203-2:2021 provides a means of conforming to the Commission Regulation (EU) No 814/2013 of 2 August 2013 supplementing Directive 2009/125/EC of the European Parliament and of the Council with regard to eco design requirements for water heaters and hot water storage tanks, except on nitrogen oxides emissions (NO_x) covered by the present standard, see Clause 10.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

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, Türkiye and the United Kingdom.

1 Scope

This document defines the specifications and test methods and also the classification, marking and energy labelling of gas-fired instantaneous water heaters for sanitary uses, hereafter called "water heaters".

This document applies to water heaters:

- of types A, B and C as described at the appropriated clauses;

NOTE For more information on the configuration of the types of appliances, see EN 1749:2020.

- using one or more combustible gases corresponding to the three gas families and at the pressures stated in accordance to EN 437:2021;
- of nominal heat input not exceeding 77 kW based on the gross calorific value (GCV);
- with an ignition burner or with direct ignition of the main burner.

In this document, the heat inputs are expressed in relation to the net calorific value (H_i).

This document does not contain all the requirements necessary for:

- boiling water appliances;
- appliances intended to be connected to a mechanical means of evacuating the combustion products;
- appliances which fulfil a dual role of space heating and heating water for sanitary use.

This document only covers water heaters where the fan, if any, is an integral part of the appliance.

This document is not intended to cover appliances designed and constructed to burn gas containing toxic components.

2 Normative references

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.

EN 88-1:2011+A1:2016, *Pressure regulators and associated safety devices for gas appliances — Part 1: Pressure regulators for inlet pressures up to and including 50 kPa*

EN 125:2010+A1:2015, *Flame supervision devices for gas burning appliances - Thermoelectric flame supervision devices*

EN 126:2012, *Multifunctional controls for gas burning appliances*

EN 161:2011+A3:2013, *Automatic shut-off valves for gas burners and gas appliances*

EN 298:2012, *Automatic burner control systems for burners and appliances burning gaseous or liquid fuels*

EN 437:2021, *Test gases - Test pressures - Appliance categories*

EN 513:2018, *Plastics - Poly(vinyl chloride) (PVC) based profiles - Determination of the resistance to artificial weathering*