BRITISH STANDARD

BS EN 677:1998

Gas-fired central heating boilers — Specific requirements for condensing boilers with a nominal heat input not exceeding 70 kW

The European Standard EN 677:1998 has the status of a British Standard

ICS 91.140.10

National foreword

This British Standard is the English language version of EN 677:1998. It supersedes DD 189:1990, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GSE/29, Domestic gas-fired central heating boilers, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

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

The English-language ratified text of EN 677:1998 contained errors which have been corrected in this version of BS EN 677:1998. The corrections are as follows: in **5.6.1**, in the paragraph after the equation, the word "respectively" has been changed to "as well as"; in annex A the first term in the third equation has been changed from η to η_u; and, to align with the French-language version, the clause entitled "Special categories marketed nationally or locally" in annex B has been renumbered **B.3**, and the first table in annex ZA has been numbered Table ZA.1.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled "International Standards Correspondence Index", or by using the "Find" facility of the BSI Standards Electronic Catalogue.

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 10, an inside back cover and a back cover.

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English version

Gas-fired central heating boilers — Specific requirements for condensing boilers with a nominal heat input not exceeding 70 kW

Chaudières de chauffage central utilisant les combustibles gazeux — Exigences spécifiques aux chaudières à condensation dont le débit calorifique nominal est inférieur ou égal à 70 kW

Heizkessel für gasförmige Brennstoffe — Besondere Anforderungen an Brennwertkessel mit einer Nennwärmebelastung kleiner als oder gleich 70 kW

This European Standard was approved by CEN on 20 June 1998.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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CEN

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Comité Européen de Normalisation
Europäisches Komitee für Normung

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Ref. No. EN 677:1998 E

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 109, Central heating boilers using gaseous fuels, the secretariat of which is held by NNI.

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 December 1998, and conflicting national standards shall be withdrawn at the latest by December 1998.

This European Standard 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 Annex ZA, which is an integral part of this standard.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Contents

1 Scope

This European Standard applies to gas-fired central heating boilers, which are declared by the manufacturer to be "condensing boilers":

— of types B (excluding appliances without a fan) and C;

— using one or more gases corresponding to the three gas families; and

— for which the nominal heat input is less than or equal to 70 kW.

This European Standard only covers type testing.

This European Standard completes or modifies the standards EN 297, prEN 483 and EN 625, hereafter called "boiler standards". It specifies supplementary requirements for condensing boilers.

2 Normative references

This European standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 297, *Gas-fired central heating boilers — Type B_{11} and B_{11BS} boilers fitted with atmospheric burners of nominal heat input not exceeding 70 kW.*

EN 437, *Test gases — Test pressures — Appliances categories.*

prEN 483:1998 *Gas-fired central heating boilers fitted — Type C boilers, fitted with atmospheric burners of nominal heat input not exceeding 70 kW.*

EN 625, *Gas-fired central heating boilers — Specific requirements for the domestic hot water operation of combination boilers of nominal heat input not exceeding 70 kW.*

3 Definitions

For the purposes of this European Standard, the definitions of the boiler standards and the following definitions apply:

3.1

condensing boiler

boiler in which, under normal operating conditions and at certain operating water temperatures, the water vapour in the combustion products is partially condensed, in order to make use of the latent heat of this water vapour for heating purposes and which satisfies the efficiency requirements of this European Standard

3.2

condensate

liquid formed from the combustion products during the condensation process

3.3

nominal condensing output

value of the useful output declared by the manufacturer, in kW, corresponding to the operation of the boiler in a 50 °C/30 °C water temperature regime

3.4

maximum allowable working temperature

temperature the material can withstand over a long period of time under working conditions

4 Constructional requirements

4.1 Materials in contact with condensate

All parts of the heat exchanger(s) and other parts of the boiler likely to come into contact with condensate shall be constructed of sufficiently corrosion resistant materials or materials protected by a suitable coating in order to ensure a reasonable life for a boiler that is installed, used and maintained in accordance with the manufacturer's instructions.

4.2 Removal of condensate

Condensate produced during operation of the boiler, including condensate formed in the flue and its connecting pipes, shall be removed by means of a discharge pipe (or pipes).

The internal diameter of the outside connection of the condensate discharge system shall be at least 13 mm.

The disposal system, forming part of the boiler or supplied with the boiler, shall be such that:

— it can be easily inspected and cleaned in accordance with the manufacturer's instructions;

— it cannot transmit combustion products into the room where the boiler is installed; this requirement is satisfied if the disposal system incorporates a water trap;

— a water trap has a seal of at least 25 mm at the maximum pressure in the combustion chamber at the maximum flue length specified by the manufacturer.

Surfaces in contact with condensates (except purpose provided drains, water traps and siphons) shall be designed to prevent condensate retention.

4.3 Control of the combustion products temperature

If the combustion products circuit contains materials that are likely to be affected by heat or is intended to be connected to a flue (including seals) that is likely to be affected by heat from the combustion products, the boiler shall incorporate a device to prevent the combustion products temperature exceeding the maximum allowable working temperature for the material as declared by the manufacturer.

The device for limiting the combustion products temperature shall be non-adjustable and shall not be accessible without tools.

If the flue gas system is not supplied with the appliance, the device for limiting the combustion products temperature may be supplied as an option to be fitted by the installer. Mounting of the device shall be well defined.

4.4 Chemical composition of the condensate

If the manufacturer states the chemical composition of the condensate it shall be checked at the end of the test of **6.3**.

5 Operational requirements

5.1 General

In addition to the boilers standards EN 297, prEN 483 and EN 625 the following requirements apply as appropriate.

5.2 Verification of the nominal condensing output

If the manufacturer states the nominal condensing output it is verified under the test conditions of **6.2**.

5.3 Formation of condensate

When the boiler is installed in accordance with the test conditions for efficiency measurement under **6.6.1**, under the conditions of **6.3** condensate shall only form at the points intended for this purpose and shall be readily drained.

Condensate shall not find its way to parts of the boiler which are not intended for formation, collection and discharge of condensate, nor may the condensate cause any nuisance to the operation, the boiler and the surroundings.

5.4 Temperature of combustion products

If the boiler incorporates a device to limit the maximum temperature of combustion products, under the conditions of **6.4**, the temperature of the combustion products shall not exceed the maximum allowable working temperature for the materials of the combustion circuit and the flue materials, specified by the boiler manufacturer.

Operation of the device shall cause non-volatile lock-out of the boiler.

5.5 Combustion

5.5.1 *Normal conditions*

The combustion requirements are those specified in the boiler standards.

The still air tests shall also be carried out when the boiler is operating in the condensing mode (50 °C/30 °C).

5.5.2 *Special conditions*

Blockage of the condensate drain(s) or switching off the pump for the discharge of the condensate shall not lead to concentrations of CO in the combustion products > 0,2 % before shut-down or lock-out occurs. There shall be no spillage of condensate from the boiler.

5.6 Efficiencies

5.6.1 *Useful efficiency*

Under the test conditions specified in **6.6.1**, the useful efficiency at the nominal heat input (or the maximum heat input and at the arithmetic mean of the maximum and the minimum heat input for range rated boilers), shall be at least:

$91 + {}^{10}\log P$ (in per cent)

where:

P is the nominal output. For range rated boilers, P is the maximum output as well as the arithmetic mean of the maximum and the minimum heat output as stated by the manufacturer, expressed in kilowatts (kW).

5.6.2 *Useful efficiency at part load*

Under the test conditions specified in **6.6.2**, the useful efficiency at 30 % of the nominal heat input, (or the arithmetic mean of the maximum and the minimum heat input for range rated boilers) shall be at least:

$97 + {}^{10}\log P$ (in per cent)

where:

P is the nominal output. For range rated boilers, P is the arithmetic mean of the maximum and the minimum heat output as stated by the manufacturer, expressed in kilowatts (kW).

6 Test methods

6.1 General

All the tests are carried out under the conditions laid down in the boiler standards, unless otherwise stated.

If the actual test conditions differ from the reference conditions (20 °C, 70 % relative humidity, 1 013,25 mbar) and/or the return water temperature differs from the specified value, the correction formulae given in Annex A are used to correct the determined useful efficiency for tests of **6.2** and **6.6.2**.

6.2 Verification of the nominal condensing output

For boilers using 2nd family gas, whether with or without another gas family, the tests are carried out with one of the corresponding 2nd family references gases.

For boilers using only 3rd family gas, the tests are carried out with one of the corresponding 3rd family reference gases.

The water rate is adjusted so as to obtain a return water temperature of (30 ± 0,5) °C and a temperature difference between flow and return temperature of (20 ± 2) °C.

The efficiency is determined as stated in the boiler standards.

It is checked that the product of the efficiency determined and the nominal heat input (maximum heat input for range rated boilers) is no less than the nominal condensing output.

6.3 Formation of condensates

The boiler shall operate continuously for 4 h under the test conditions of **6.2**.

It is verified that the requirement of **5.3** is fulfilled.

6.4 Temperature of combustion products

The boiler is installed as specified in the general test conditions of the boiler standards and supplied with one of the corresponding reference gases for the boiler category at the nominal heat input.

Type B boilers are connected to a 1 m test flue and type C boilers are fitted with the shortest ducts specified by the manufacturer.

The boiler thermostat is put out of operation.

Where fitted, the control to limit the temperature of combustion products remains in operation.

The temperature of the combustion products is progressively raised, either by increasing the gas rate or by another means which increases the temperature (e.g. removal of baffles) as specified by the manufacturer.

It is verified that the requirement of **5.4** is fulfilled.

6.5 Combustion

6.5.1 *Normal conditions*

The combustion characteristics are verified in accordance with the boiler standards under two water temperature regimes: 80 °C/60 °C and 50 °C/30 °C.

6.5.2 *Special conditions*

The boiler is operated continuously under the test conditions of **6.2**. With the condensate drain blocked or with a built-in pump for the discharge of condensate placed out of operation, the concentration of CO in the combustion products is checked to fulfil the requirement **5.5.2** until shut-down or lock-out occurs.

6.6 Efficiencies

For boilers using 2nd family gas, whether with or without another gas family, the tests are carried out with one of the corresponding 2nd family reference gases.

For boilers using only 3rd family gas, the tests are carried out with one of the corresponding 3rd family reference gases.

6.6.1 *Useful efficiency*

The efficiency is determined at the nominal heat input for boilers without range rating. For range rating boilers the efficiency is determined at the maximum heat input and at the arithmetic mean of the maximum and minimum heat input.

The water rate is adjusted so as to obtain a return water temperature of (60 ± 1) °C and a temperature difference between flow and return water temperature of (20 ± 2) °C.

The efficiency is determined as stated in the boiler standards.

It is checked that the determined efficiencies are no less than the requirements of **5.6.1**.

6.6.2 *Useful efficiency at part load*

The useful efficiency at part load is determined at 30 % of the nominal heat input for boilers without range rating. For range rating boilers the efficiency is determined at 30 % of the arithmetic mean of the maximum and minimum heat input.

The useful efficiency at part load is determined under the test conditions of the boiler standards with a constant return water temperature of $(30 \pm 0{,}5)$ °C. For boilers using only 3rd family gases, 2,4 is added for this value.

It is checked that the requirements of **5.6.2** are met.

7 Marking

7.1 Data plate

In addition to the information specified in the boiler standards, the term “condensing boiler” shall appear on the data plate and optionally the nominal condensing output (in kW).

7.2 Instructions

7.2.1 *Technical instructions for the installer*

In addition to the provisions mentioned in the boiler standards, the installation instructions shall include the following information:

— detailed specifications for the means of discharging the combustion products and the condensate. Attention shall be drawn to the necessity of avoiding horizontal runs in the flue gas duct and the condensate draining duct, furthermore the minimum slope for these ducts shall be indicated;

— for type C boilers, the measures to be taken to avoid continuous discharge of condensate from the terminal;

— when the boiler complies with the requirements of **5.4** for combustion products temperature, the manufacturer shall specify or supply the flue ducts and their accessories to be used, otherwise the manufacturer shall specify that the boiler is not intended to be connected to flues that are likely to be affected by heat (e.g. plastic ducts or ducts with internal plastic coatings);

— reference to the national and/or local regulations for the discharge of condensate, in particular instructions for the installation of the condensing boiler where a condensate neutralization system is necessary.

7.2.2 ***Use and maintenance instructions for the user***

In addition to the provisions mentioned in the particular specifications for the boiler concerned, the user's instructions shall include a brief description of the operation of the boiler. The instructions shall state that the condensate outlet(s) shall not be modified or blocked and shall include instructions relating to the cleaning and servicing of any condensate neutralization system.

Annex A (normative)

Correction for the determined efficiency in the low water temperature test of condensing boilers[1)]

If the air humidity of the combustion air under the test conditions differs from the standard value, the determined efficiency in the low water temperature tests (return water temperature $T_{ret,st} = 30$ °C) is corrected with

$$\Delta\eta_{cond,1} = 0{,}08\ (\chi_{air,st} - \chi_{air,m})$$

[absolute value in per cent]

where:

$\Delta\eta_{cond,1}$ is the correction of the measured useful efficiency for air humidity deviation from the reference value in per cent;

$\chi_{air,m}$ is the air humidity of the combustion air under the test conditions in grams per kilogram of dry air;

$\chi_{air,st}$ is the air humidity of the combustion air under the reference conditions in grams per kilogram of dry air ($\chi_{air,st} = 10$ g/kg).

If the return water temperature differs from the standard value for the low water temperature tests the determined efficiency is corrected with

$$\Delta\eta_{cond,2} = 0{,}12(T_{ret,m} - T_{ret,st})$$

[absolute value in per cent]

where:

$\eta_{cond,2}$ is the correction of the measured useful efficiency for return temperature deviation from the reference value in per cent

$T_{ret,m}$ is the return water temperature under the test conditions in degrees Celsius;

$T_{ret,st}$ is the reference value for the return water temperature for the low water temperature tests (30 °C).

The total correction is thus

$$\eta_u = \eta_m + \Delta\eta_{cond,1} + \Delta\eta_{cond,2}$$

where:

η_u is the useful efficiency under reference conditions in per cent;

η_m is the measured useful efficiency in per cent.

These corrections shall be applied for test conditions where

$$0 \leq \chi_{air,m} \leq 20 \text{ g/kg dry air}$$

and

$$25 \leq T_{ret,m} \leq 35 \text{ °C}$$

[1)] The corrections in this annex are based on the results of Work Package 2 (Influence of ambient conditions) of the European project "Full and part load efficiency measurements for boilers", which is sponsored by the EC Bureau Communautaire de Référence.

Annex B (informative)
Special national conditions[2)]

B.1 General

The conditions specified in the boiler standards EN 297, prEN 483 and EN 625 apply with the following supplements.

B.2 Gas groups distributed locally

Table B.1 — Test gases and test pressures corresponding to national or local situations, dry gas at 15 °C and 1 013,25 mbar

Gas family		Nature of gas	Designation	Composition by volume	Wi	Hi	Ws	Hs	d	Test pressures	Country code
				%	MJ/m^3	MJ/m^3	MJ/m^3	MJ/m^3		mbar	
Gas linked to the first family	Group C	Reference gas (air propane)	G 130	C_3H_8 = 26,9 Air[1)] = 73,1	22,14	23,66	24,07	25,72	1,142	p_n = 8 p_{min} = 6 p_{max} = 15	FR
		Light back limit gas	G 132	C_3H_8 = 13,8 C_3H_6 = 13,8 Air[1)] = 72,4	22,10	23,56	23,84	25,41	1,136		
Gas of the second family	Range Es of group E	Reference gas	G20	CH_4 = 100	45,67	34,02	50,72	37,78	0,555	p_n = 20 p_{min} = 17 p_{max} = 25	FR
		Incomplete combustion and sooting limit gas	G21	CH_4 = 87 C_3H_8 = 13	49,60	41,01	54,76	45,28	0,684		
		Light-back limit gas	G 222	CH_4 = 77 H_2 = 23	42,87	28,53	48,87	31,86	0,443		
		Flame lift limit gas	G 26	CH_4 = 80 C_3H_8 = 7 N_2 = 13	40,52	33,36	44,83	36,91	0,678		
	Range Ei of group E	Reference gas and flame lift limit gas	G 25	CH_4 = 86 N_2 = 14	37,38	29,25	41,52	32,49	0,612	p_n = 25 p_{min} = 20 p_{max} = 30	FR
		Incomplete combustion and sooting limit gas	G 26	CH_4 = 80 C_3H_8 = 7 N_2 = 13	40,52	33,36	44,83	36,91	0,678		
		Flame lift limit gas	G 231	CH_4 = 85 N_2 = 15	36,82	28,91	40,90	32,11	0,617		

[1)] Composition of air (%): O2 = 20,95; N_2 = 79,05.

[2)] As this annex does not contain any information which is not given in EN 437 it is recommended to replace it with a reference to EN 437.

B.3 Special categories marketed nationally or locally

Table B.2 — Test gases corresponding to the categories marketed nationally or locally

Category	Reference gas	Incomplete combustion limit gas	Light-back limit gas	Flame lift limit gas	Sooting limit gas	Country code
I_{2Esi}	G 20, G 25	G 21	G 222	G 231	G 21	FR
I_{2Er}	G 20, G 25	G 21	G 222	G 231	G 21	FR
II_{2Esi3+}, II_{2Er3+}	G 20, G 25, G 30	G 21	G 222, G 32	G 231, G 31	G 30	FR
II_{2ESi3P}, II_{2Er3P}	G20, G25, G 31	G 21	G 222, G 32	G 231, G31	G 31, G 32	FR
$III_{1c2Esi3+}$	G 130, G 20, G 25, G 30	G 21	G 132, G 222, G32	G 231, G31	G 30	FR
$III_{1c2Er3+}$	G 130, G 20, G 25, G 30	G 21	G 132, G 222, G 32	G 231, G 31	G 30	FR
$III_{1c2Esi3P}$	G 130, G 20, G 25, G 31	G 21	G 132, G 222, G 32	G 231, G 31	G 32	FR
III_{1cEr3P}	G 130, G 20, G 25, G 31	G 21	G 132, G 222, G 32	G 231, G 31	G 32	FR

Category I

Category I_{1c}: boilers using only gases of group c linked to the first family at a fixed supply pressure (this category is not used).

Category I_{2Esi}: boilers capable of using only gases of group E of the second family, and operating under the appropriate pressure couple. The replacement of a gas of range Es of group E (Wobbe numbers between 44,8 MJ/m^3 and 54,7 MJ/m^3) by a gas of range Ei of group E (Wobbe numbers between 40,9 MJ/m^3 and 44,8 MJ/m^3) or vice versa necessitates a modification to the burner setting and possibly a change of injectors or restrictors (see boiler standards).

Category I_{2Er}: boilers capable of using only gases of group E of the second family and able to operate without modification to the boiler with the pressure couple. However, specific adjustment of the burner gas rate is optional when replacing one gas of range Es of group E (Wobbe numbers between 44,8 MJ/m^3 and 54,7 MJ/m^3) for a gas of range Ei of group E (Wobbe numbers between 40,9 MJ/m^3 and 44,8 MJ/m^3). If this adjustment has been carried out, a re-adjustment is then necessary for going back to using a gas of range Es of group E (see boiler standards).

Category II

Category II_{2Esi3+}: boilers capable of using gases of group E of the second family and gases of the third family. The second family gases are used under the same conditions as category I_{2Esi}. The third family gases are used under the same conditions as for category I_{3+} (see boiler standards).

Category II_{2Esi3P}: boilers capable of using gases of group E of the second family and gases of group P of the third family. The second family gases are used under the same conditions as for category I_{2Esi}. The third family gases are used under the same conditions as for category I_{3P} (see boiler standards).

Category II_{2Er3+}: boilers capable of using gases of group E of the second family and gases of the third family. The second family gases are used under the same conditions as for category $I_{2Er.}$ The third family gases are used under the same conditions as for category I_{3+} (see boiler standards).

Category II_{2Er3P}: boilers capable of using gases of group E of the second family and gases of group P of third family. The second family gases are used under the same conditions as for category $I_{2Er.}$ The third family gases are used under the same conditions as for category I_{3P} (see boiler standards).

Category III

Category $III_{1c2Esi3+}$: boilers capable of using gases of group c linked to the first family, gases of group E of the second family and gases of the third family. The gases linked to the first family are used under the same conditions as for category $I_{1c.}$ The second family gases are used under the same conditions as for category I_{2Esi}. The gases of the third family are used under the same conditions as for category I_{3+} (see boiler standards).

Category $III_{1c2Er3+}$: boilers capable of using gases of group c linked to the first family, gases of group E of the second family and gases of the third family. Gases linked to the first family are used under the same conditions as for category I_{1c}. Second family gases are used under the same conditions as for category I_{2Er}. Third family gases are used under the same conditions as for category I_{3+} (see boiler standards).

Category $III_{1c2Esi3P}$: boilers capable of using gases of group c linked to the first family, gases of group E of the second family and gases of group P of the third family. Gases linked to the first family are used under the same conditions as for category I_{1c}. Second family gases are used under the same conditions as for category I_{2Esi}. Gases of the third family are used under the same conditions as for category I_{3P} (see boiler standards).

Category $III_{1c2Er3P}$: boilers capable of using gases of group c linked to the first family, gases of group E of the second family and gases of group P of the third family. Gases linked to the first family are used under the same conditions as for category $I_{1c.}$ Second family gases are used under the same conditions as for category I_{2Er}. Third family gases are used under the same conditions as for category I_{3P} (see boiler standards).

Annex C (informative)

A-deviations

A-deviation: national deviation due to regulations, the alteration of which is for the time being outside the competence of the CEN/CENELEC member.

This European Standard falls under Directive 90/396/EEC (Gas Appliance Directive)

NOTE (from CEN/CENELEC IR Part 2, **3.1.9**):

Where standards fall under EC Directives, it is the view of the Commission of the European Communities (OJ No. G 59, 9.3.1982) that the effect of the decision of the Court of Justice in case 815/79 Cremonini/Vrankovich (European Court Reports 1980, p. 3583) is that compliance with A-deviations is no longer mandatory and that the free movement of products complying with such a standard should not be restricted except under the safeguard procedure provided for in the relevant Directive.

A-deviations in an EFTA country are valid instead of the relevant provisions of the European Standard in that country until they have been removed.

A-deviation for Switzerland

In deviation to the requirements of **5.5**and.**5.6**, the limit values for the energy requirements (flue losses, standby losses) and for the emission of CO and NO_x of the Swiss law (Luftreinhalte-Verordnung, LRV) of 1985-12-16 (state from 1992-01-01) are applicable.

Annex ZA (informative)

Clauses of this European Standard addressing essential requirements or other provisions of EU Directives.

This European Standard 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 90/396/EEC (Gas Appliance Directive) and EU Directive 92/42/EEC (Efficiency Directive).

Warning: other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this European Standard.

The following clauses of this European Standard are likely to support requirements of the Gas Appliances Directive and the Efficiency Directive.

Compliance with these clauses of this European Standard provides one means of conforming with the specific essential requirements of the Directive concerned and associated EFTA regulations.

Only relevant essential requirements are included in this Table. All other requirements are already covered in the boiler standards.

Table ZA.1

Essential requirement	Object	Clause in the standard
1	ANNEX 1 of the Directive GENERAL CONDITIONS	
1.2	Marking and instructions Installation instructions User's instructions and maintenance instructions for the user	**7.1**and **7.2** **7.2.1** **7.2.2**
1.2.1	Information in the installation instructions Discharge of combustion products	**7.2.1** **7.2.1**
1.2.2	Contents of the user's instructions and maintenance instructions	**7.2.2**
1.3	Equipment	**4.3**
2	Materials	
2.1	Characteristics	**4.1**
3	Design and construction	
3.1.2	Condensation	**4.1**
3.1.9	Failure of the safety devices Overheat protection	 **4.3**
3.4.1	Flame stability Concentration of substances harmful to the health in the combustion products	**5.5.1** **5.5.1**
3.5	Rational use of energy	**5.6**

Table ZA.2 — Table identifying conformity with the relevant articles of the Efficiency Directive

Relevant articles of the Directive	Object	Clauses in the standard which comply wholly or in part with the article
1	Field of application	**1**
2	Definitions	**3**
3	Exclusions	Not applicable
4.3	Efficiency of living space dedicated boilers	Not applicable
5.1	Efficiency requirements	**5.6.1** and **5.6.2**
5.2	Verification methods	**6.6.1** and **6.6.2**

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