



Institut luxembourgeois de la normalisation
de l'accréditation, de la sécurité et qualité
des produits et services

ILNAS-EN 14394:2005+A1:2008

**Heating boilers - Heating boilers with
forced draught burners - Nominal heat
output not exceeding 10 MW and
maximum operating temperature of**

Chaudières de chauffage - Chaudières
avec brûleurs à air soufflé - Puissance
utile inférieure ou égale à 10 MW et
température maximale de service de 110

Heizkessel - Heizkessel mit
Gebläsebrennern - Nennwärmeleistung
kleiner oder gleich 10 MW und einer
maximalen Betriebstemperatur von 110 °

08/2008

National Foreword

This European Standard EN 14394:2005+A1:2008 was adopted as Luxembourgish Standard ILNAS-EN 14394:2005+A1:2008.

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ILNAS-EN 14394:2005+A1:2008

EUROPEAN STANDARD **EN 14394:2005+A1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

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English Version

**Heating boilers - Heating boilers with forced draught burners -
Nominal heat output not exceeding 10 MW and maximum
operating temperature of 110 °C**

Chaudières de chauffage - Chaudières avec brûleurs à air
soufflé - Puissance utile inférieure ou égale à 10 MW et
température maximale de service de 110 °C

Heizkessel - Heizkessel mit Gebläsebrennern -
Nennwärmeleistung kleiner oder gleich 10 MW und einer
maximalen Betriebstemperatur von 110 °C

This European Standard was approved by CEN on 14 October 2005 and includes Amendment 1 approved by CEN on 28 June 2008.

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 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 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

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (EN 14394:2005+A1:2008) 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 February 2009 and conflicting national standards shall be withdrawn at the latest by February 2009.

This document includes Amendment 1 approved by CEN on 2008-06-28.

The start and finish of text introduced or altered by amendment is indicated in the text by tags $\boxed{A_1}$ $\triangleleft A_1$.

This document supersedes EN 14394:2005.

According to edition 2005 the following fundamental changes are given:

- Consideration of the Directive 97/23/EC Pressure Equipment Directive (PED) and including of Annex ZB;
- Correction of some typing errors.

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 Directives.

$\boxed{A_1}$ For relationship with EU Directives, see informative Annexes ZA and ZB, which are integral parts of this document. $\triangleleft A_1$

$\boxed{A_1}$ The requirements and test methods related to the Essential Requirements of the Council Directive 90/396/EEC relating to appliances burning gaseous fuels (Gas Appliance Directive – GAD) for assemblies made up of a boiler body complying with EN 303-1 and a forced draught gas burner complying with EN 676 with a nominal heat output not exceeding 1.000 kW are covered in the Harmonized European Standard EN 303-3:1998 and its Amendment A2:2004. For assemblies with a heat output between 1.000 kW and 10 MW however no Harmonized European Standard does exist at the moment. The relevant clauses of EN 303-3:1998 can be taken as a basis to prove conformity with the essential requirements of the GAD. $\triangleleft A_1$

This European Standard specifies requirements for boilers operating with a temperature of 100 °C and 110 °C which are not covered by the Pressure Equipment Directive (PED, $TS \leq 110$ °C), on the other hand the document specifies requirements for those boilers, which have a maximum allowable temperature $TS > 110$ °C (according to the PED).

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

A1 This European Standard specifies the requirements and test methods for the design, manufacturing, safe operation and the rational energy usage for standard boilers and low temperature boilers (with „boiler" in the sense of „boiler body") from steel and cast iron to be equipped with separately marketed forced draught burners according to the relevant burner standards (for automatic forced draught burners for gaseous fuels see EN 676 and for atomising oil burners see EN 267) up to a nominal heat output of 10 MW. They are operated, either with negative pressure (natural draught boiler) or with positive pressure (pressurised boiler) in the combustion chamber, in accordance with the boiler manufacturer's instructions. **A1**

A1 This European Standard specifies requirements for boilers with normal operating temperatures between 100 °C and 110 °C and has a "dual structure":

- For boilers where the shut off temperature of the safety temperature limiter does not exceed 110 °C the Pressure Equipment Directive (PED) requires "Sound Engineering Practice",
- For boilers where the shut off temperature of the safety temperature limiter exceeds 110 °C this European Standard specifies the requirements of the PED as stated in Annex ZB.

NOTE 1 The "maximum allowable temperature TS" is defined in the PED and its Guidelines. **A1**

Boilers in accordance with this European Standard are designed for the heating of central heating installations in which the heat carrier is water, and the maximum allowable operating temperature of which is up to 110 °C and the maximum safety temperature limiter of 120 °C. The maximum allowable operating pressure is 10 bar.

This standard does not apply to gas boilers with atmospheric burners, boilers for solid fuels, oil or gas fired condensation boilers, boilers with oil vaporisation burners. For these boilers there are further requirements.

For gas-fired central heating boilers equipped with a forced draught burner of nominal heat output not exceeding 1000 kW, see **A1** EN 303-7 **A1**.

For shell boilers with a nominal heat output exceeding 10 MW and a maximum safety temperature limiter exceeding 120 °C, see EN 12953 series.

A1 NOTE 2 Definitions for standard boiler and low temperature boiler see Council Directive 92/42/EEC. **A1**

2 Normative references

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 267, *Forced draught oil burners – Definitions, requirements, testing, marking*

EN 287–1, *Qualification test of welders – Fusion welding – Part 1: Steels*

A1 *deleted text* **A1**

EN 303–1, *Heating boilers - Part 1: Heating boilers with forced draught burners - Terminology, general requirements, testing and marking*

EN 303-2, *Heating boilers - Part 2: Heating boilers with forced draught burners - Special requirements for boilers with atomising oil burners*

A1 EN 303-3, *Heating boilers - Part 3: Gas-fired central heating boilers - Assembly comprising a boiler body and a forced draught burner* **A1**

EN 304, *Heating boilers – Test code for heating boilers for atomising oil burners*

EN 1561, *Founding – Grey cast irons*

EN 1563, *Founding – Spheroidal graphite cast irons*

EN 10025-1, *Hot rolled products of structural steels - Part 1: General technical delivery conditions*

EN 10025-2, *Hot rolled products of structural steels - Part 2: Technical delivery conditions for non-alloy structural steels*

EN 10025-3, *Hot rolled products of structural steels - Part 3: Technical delivery conditions for normalized/normalized rolled weldable fine grain structural steels*

EN 10088-1, *Stainless steels - Part 1: List of stainless steels*

EN 10088-2, *Stainless steels - Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes*

EN 10204:2004, *Metallic products - Types of inspection documents*

EN 10216-1, *Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 1: Non-alloy steel tubes with specified room temperature properties*

EN 10216-2, *Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 2: Non-alloy and alloy steel tubes with specified elevated temperature properties*

EN 10216-3, *Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 3: Alloy fine grain steel tubes*

EN 10216-4, *Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 4: Non-alloy and alloy steel tubes with specified low temperature properties*

EN 10216-5, *Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 5: Stainless steel tubes*

EN 10217-1, *Welded steel tubes for pressure purposes - Technical delivery conditions - Part 1: Non-alloy steel tubes with specified room temperature properties*

EN 10217-2, *Welded steel tubes for pressure purposes - Technical delivery conditions - Part 2: Electric welded non-alloy and alloy steel tubes with specified elevated temperature properties*

EN 10217-3, *Welded steel tubes for pressure purposes - Technical delivery conditions - Part 3: Alloy fine grain steel tubes*

EN 10217-4, *Welded steel tubes for pressure purposes - Technical delivery conditions - Part 4: Electric welded non-alloy steel tubes with specified low temperature properties*

EN 10217-5, *Welded steel tubes for pressure purposes - Technical delivery conditions - Part 5: Submerged arc welded non-alloy and alloy steel tubes with specified elevated temperature properties*

EN 10217-6, *Welded steel tubes for pressure purposes - Technical delivery conditions - Part 6: Submerged arc welded non-alloy steel tubes with specified low temperature properties*

EN 10217-7, *Welded steel tubes for pressure purposes - Technical delivery conditions - Part 7: Stainless steel tubes*

EN 10226-1, *Pipe threads where pressure tight joints are made on the threads - Part 1: Taper external threads and parallel internal threads - Dimensions, tolerances and designation*

EN 10226-3, *Pipes threads where pressure tight joint are made on the threads - Part 3: Verification by means of limit gauges*

EN 12828, *Heating systems in buildings - Design for water-based heating systems*

EN 12953-8, *Shell boilers - Part 8: Requirements for safeguards against excessive pressure*

EN 22553, *Welded, brazed and soldered joints – Symbolic representation on drawings (ISO 2553:1992)*

EN 60335-1, *Household and similar electrical appliances - Safety - Part 1: General requirements (IEC 60335-1:2001, modified)*



EN 60529, *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989)*

EN 60730-2-9, *Automatic electrical controls for household and similar use - Part 2-9: Particular requirements for temperature sensing controls (IEC 60730-2-9:2000, modified)*

EN ISO 228-1, *Pipe threads where pressure-tight joints are not made on the threads - Part 1: Dimensions, tolerances and designation (ISO 228-1:2000)*



EN ISO 228-2, *Pipe threads where pressure-tight joints are not made on the threads - Part 2: Verification by means of limit gauges (ISO 228-2:1987)*

EN ISO 4063, *Welding and allied processes – Nomenclature of processes and reference numbers (ISO 4063:1998)*

EN ISO 6506-1, *Metallic materials – Brinell hardness test – Part 1: Test method*  (ISO 6506-1:2005) 

EN ISO 9606-2, *Qualification test of welders - Fusion welding - Part 2: Aluminium and aluminium alloys (ISO 9606-2:2004)*

EN ISO 15607, *Specification and qualification of welding procedures for metallic materials - General rules (ISO 15607:2003)*

EN ISO 15609-1,  *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 1: Arc welding (ISO 15609-1:2004)* 

EN ISO 15610, *Specification and qualification of welding procedures for metallic materials - Qualification based on tested welding consumables (ISO 15610:2003)*

EN ISO 15611, *Specification and qualification of welding procedures for metallic materials - Qualification based on previous welding experience (ISO 15611:2003)*

EN ISO 15612, *Specification and qualification of welding procedures for metallic materials - Qualification by adoption of a standard welding procedure (ISO 15612: 2004)*

EN ISO 15613, *Specification and qualification of welding procedures for metallic materials - Qualification based on pre-production welding test (ISO 15613:2004)*

EN ISO 15614-1, *Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys (ISO 15614-1:2004)*

EN ISO 15614-2, *Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 2: Arc welding of aluminium and its alloys (ISO 15614-2:2005)*

ISO 185, *Grey cast irons – Classification*

ISO 857-1, *Welding and allied processes – Vocabulary – Part 1: Metal welding processes*

ISO 7005-1, *Metallic flanges – Part 1: Steel flanges*

ISO 7005-2, *Metallic flanges – Part 2: Cast iron flanges*

ISO 7005-3, *Metallic flanges – Part 3: Copper alloy and composite flanges*

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply.

3.1

maximum allowable pressure PS

maximum pressure for which the equipment is designed, as specified by the manufacturer

3.2

test pressure

pressure to which all boilers and their parts are subjected during production in the works of the manufacturer or during setting up by the installer

3.3

type test pressure

pressure to which the pre-production heating boiler(s) and associated parts are subjected before start of mass production in the manufacturing works

3.4

temperature

3.4.1

maximum/minimum allowable temperature TS

maximum/minimum temperatures for which the equipment is designed, as specified by the manufacturer

3.4.2

operating temperature

maximum allowable temperature at which the boiler can be operated under normal operation conditions at the maximum setting of the boiler's water temperature controller

3.5

heat output P (heat output range)

amount of heat transferred to the water per unit of time

The heat output range is the span of output below the nominal heat output specified by the manufacturer over which the boiler meets the requirements of this standard and over which it can be used.

3.6

nominal heat output $\langle A_1 \rangle P_n \langle A_1 \rangle$

continuous output specified by the manufacturer in accordance with the requirements of this standard. It is the maximum useful quantity of heat transferred to the heat carrier per hour

3.7

heat input Q_B

amount of heat in unit time which is supplied to the furnace of the heating boiler by the fuel based on its net calorific value H_i

3.8

boiler efficiency $\langle A_1 \rangle \eta_K \langle A_1 \rangle$

ratio of the nominal output (P_n) to the heat input (Q_B) supplied by the fuel

$$\eta_K = \frac{P_n}{Q_B}$$

3.9

required draught

pressure differential between the static air pressure in the place of installation and the static pressure of the exhaust gases, as measured in the exhaust gas measuring section, which is required for correct operation of the boiler at nominal output