SLOVENSKI STANDARD
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Plinski kotli za gretje - 1. del: Splošne zahteve in preskusi

Gas-fired heating boilers - Part 1: General requirements and tests

Heizkessel fur gasformige Brennstoffe - Teil 1: Allgemeine Anforderungen und Prufungen

Chaudières de chauffage central utilisant les combustibles gazeux - Exigences générales et essais

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 15502-1:2012) has been prepared by Technical Committee CEN/TC 109 “Central heating boilers using gaseous fuels”, the secretariat of which is held by NEN.

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of an identical text or by endorsement, at the latest by January 2013, and conflicting national standards shall be withdrawn at the latest by January 2013.

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 has been prepared under mandates M89/6 and M066, given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements as meant in article 3 of EU Directive 2009/142/EC, relating to appliances burning gaseous fuels and the verification methods valid for production and measurements, as meant in article 5.2 of EU Directive 92/42/EEC, relating to the efficiency requirements for new hot water boilers fired with liquid or gaseous fuels, with an output of 4 – 400 kW.

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

Annex V lists which existing standards are intended to be replaced by this standard in combination with the relevant Part 2. The standards listed in Annex V are to be used until the relevant Part 2 cover the types indicated. This European Standard by itself does not replace any European Standard.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

A gas-fired heating boiler is an appliance using gas as fuel designed to heat water with the purpose of providing heat to a building (or portion of a building) from one point to multiple rooms using heat emitters such as radiators and convectors to transmit the heat from the water to the room. The boiler may also be used to provide domestic hot water via an indirect hot water storage tank.

The basic function of gas-fired heating boiler is to generate heat by direct heat transfer in a heat exchanger, from the combustion gasses to the water.

The boiler may include in one design more than one function. It may include for example:

— a sanitary hot water function;

— a function to supply the combustion air from the outside of the building;

— a function to dispose the combustion products to the outside of the building.

The boiler design may be supplied to the market in more than one part. If the boiler is supplied to the market in multiple parts, the boiler is the assembly of various parts according to the installation instructions.

Boilers may be designed to be connected to specific parts of a building. Connection to a chimney and the means of combustion air supply is particularly relevant.

This European Standard was established to deal with aspects related to:

a) safety;

b) rational use of energy;

c) fitness for purpose.

This European Standard is a first part of a series of standards that will describe the special requirements for specific boiler types. This European Standard contains the common requirements that are applicable for the majority of the specific boiler types.

This European Standard is to be used in conjunction with the specific Part 2.

Matters related to quality assurance systems, tests during production, and certificates of conformity of auxiliary devices are not dealt with in this series of European Standards.

1 Scope

This European Standard specifies the common requirements and test methods concerning, in particular the construction, safety, fitness for purpose, and rational use of energy, as well as the classification and marking of gas-fired central heating boilers that are fitted with atmospheric burners, fan assisted atmospheric burners or fully premixed burners, and are hereafter referred to as “boilers”.

This European Standard is to be used in conjunction with the specific Parts 2 (Part 2-1 and following ones).

This European Standard applies to boilers of types B and C, according to CEN/TR 1749:2009:

a) that use one or more combustible gases of the three gas families at the pressures stated in EN 437;

b) where the temperature of the heat transfer fluid does not exceed 105 °C during normal operation;

c) where the maximum operating pressure in the water circuit does not exceed 6 bar;

d) which can give rise to condensation under certain circumstances;

e) which are declared in the installation instructions to be either a “condensing” boiler or a "low temperature boiler" or a “standard boiler”. If no declaration is given the boiler is to be considered a “standard boiler”

f) which are intended to be installed inside a building or in a partially protected place;

g) which are intended to produce hot water either by the instantaneous or storage principle, the whole being marketed as a single unit.

This European Standard applies to boilers designed for sealed water systems or for open water systems.

This general standard and the specific standards (see Part 2) provide requirements for boilers with known constructions. For boilers with any alternative constructions, which might not fully be covered by this standard or a specific standard, the risk associated with this alternative construction will need to be assessed.

An example of an assessment methodology, based upon risk assessment, is given in Clause 11.

This European Standard is not intended to cover appliances intended for connection to gas grids where the quality of the distributed gas is likely to vary to a large extent over the lifetime of the appliance.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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, *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, *Flame supervision devices for gas burning appliances — Thermoelectric flame supervision devices*

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

EN 161:2011, *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 437:2003+A1:2009, *Test gases — Test pressures — Appliance categories*

EN 1057:2006+A1:2010, *Copper and copper alloys — Seamless, round copper tubes for water and gas in sanitary and heating applications*

EN 1092-1:2007, *Flanges and their joints —- Circular flanges for pipes, valves, fittings and accessories, PN designated – Part 1: Steel flanges*

EN 1092-2:1997, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 2: Cast iron flanges*

EN 1092-3:2003, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 3: Copper alloy flanges*

EN 1092-4:2002, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 4: Aluminium alloy flanges*

CR 1404:1994, *Determination of emissions from appliances burning gaseous fuels during type-testing*

CEN/TR 1749:2009, *European scheme for the classification of gas appliances according to the method of evacuation of the combustion products (types)*

EN 10029:2010, *Hot-rolled steel plates 3 mm thick or above — Tolerances on dimensions and shape*

EN 10226-1:2004, *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 10226-2:2005, *Pipe threads where pressure tight joints are made on the threads — Part 2: Taper external threads and taper internal threads — Dimensions, tolerances and designation*

EN 12067-2:2004, *Gas/air ratio controls for gas burners and gas burning appliances — Part 2: Electronic types*

EN 13203-1:2006, *Gas-fired domestic appliances producing hot water — Appliances not exceeding 70 kW heat input and 300 l water storage capacity — Part 1: Assessment of performance of hot water deliveries*

EN 13611:2007+A2:2011, *Safety and control devices for gas burners and gas burning appliances — General requirements*

EN 14459:2007, *Control functions in electronic systems for gas burners and gas burning appliances — Methods for classification and assessment*

EN 50090 *(all parts), Home and Building Electronic Systems (HBES)*

EN 60335-1:2002, *Household and similar electrical appliances — Safety — Part 1: General requirements (IEC 60335-1:2001, modified)*

EN 60335-2-102:2006, *Household and similar electrical appliances — Safety — Part 2-102: Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections (IEC 60335-2-102:2004, modified)*

EN 60529:1991, *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989)*

EN 60730-2-9:2010, *Automatic electrical controls for household and similar use — Part 2-9: Particular requirements for temperature sensing controls (IEC 60730-2-9:2008, modified)*

EN ISO 228-1:2003, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation (ISO 228-1:2000)*

prEN ISO 2553:2011, *Welding and allied processes — Symbolic representation on drawings — Welded, brazed and soldered joints (ISO/DIS 2553:2011)*

EN ISO 3166-1:2006, *Codes for the representation of names of countries and their subdivisions — Part 1: Country codes (ISO 3166-1:2006)*

EN ISO 4063:2010, *Welding and allied processes — Nomenclature of processes and reference numbers (ISO 4063:2009, Corrected version 2010-03-01)*

ISO 857-1:1998, *Welding and allied processes — Vocabulary — Part 1: Metal welding processes*

ISO 857-2:2005, *Welding and allied processes — Vocabulary — Part 2: Soldering and brazing processes and related terms*

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 437:2003+A1:2009 and the following apply.

3.1.1 Gas supply

3.1.1.1
aeration adjuster
device enabling the primary aeration of a burner to be set to the desired value according to the supply conditions

3.1.1.2
gas circuit
assembly of parts of the boiler that carry or contain the combustible gas between the boiler gas inlet connection and the point at which air is admitted

3.1.1.3
gas inlet connection
part of the boiler intended to be connected to the gas supply

3.1.1.4
gas rate adjuster
component allowing the gas rate of the burner to be brought to a predetermined value according to the supply conditions

Note 1 to entry: The action of operating this device is called “adjustment of the gas rate”.

3.1.1.5
injector
component that admits gas into the burner

3.1.1.6
putting an adjuster or a control device out of service
action intended to put an adjuster or control (rate, pressure, etc.) out of service

3.1.1.7
range-rating device
component on the boiler intended to be used by the installer to adjust the nominal heat input of the boiler within the range of maximum and minimum heat inputs stated by the manufacturer, to suit the actual heat requirements of the installation

3.1.1.8
restrictor
device (with one or more orifices if any), which is placed in the gas circuit so as to create a pressure drop and thus bring the gas pressure at the burner to a predetermined value for a given supply pressure and a given rate

3.1.1.9
sealing an adjuster or a control
arrangements made to make evident any attempt to change its adjustment (e.g. breakage of a device or of a sealing material)

Note 1 to entry: A sealed adjuster or control is considered to be non-existent.

3.1.2 Burners

3.1.2.1
alternating ignition burner
ignition burner that is extinguished as soon as ignition of the main burner is effected and re-igniting at the main burner flame just before the latter extinguishes

3.1.2.2
automatic ignition system
automatic system which ignites the ignition burner or the main burner directly

3.1.2.3
ignition burner
burner intended to ignite a main burner

3.1.2.4
ignition device
any means (flame, electrical ignition device or other device) used to ignite the gas admitted to the ignition burner or the main burner

3.1.2.5
intermittent ignition burner
ignition burner that is ignited before and extinguished at the same time as the main burner

3.1.2.6
interrupted ignition burner
ignition burner that operates only during the ignition period

3.1.2.7
main burner
burner that is intended to assure the thermal function of the boiler, generally called “the burner”

3.1.2.8
manual ignition device
device by means of which the ignition burner is ignited following manual intervention

3.1.2.9
pre-mixed burner
burner in which the gas and a quantity of air at least equal to that theoretically necessary for complete combustion are mixed before the flame ports

3.1.2.10
permanent ignition burner
ignition burner that operates continuously throughout the whole period that the boiler is in use

3.1.3 Air supply and combustion products circuit

3.1.3.1
combustion circuit
circuit from the air inlet to the combustion products outlet of the appliance

Note 1 to entry: This will include the combustion chamber and heat exchanger and depending on the type includes the air supply duct, the combustion products evacuation duct, the fitting piece, the connection to the terminal, the inlet terminal, the outlet terminal.

3.1.3.2
air supply circuit
means for transporting combustion air to the burner

3.1.3.3
combustion products evacuation duct
means for transporting combustion products to the outlet of the appliance or to the terminal

3.1.3.4
damper
device placed in the air inlet duct or the combustion products outlet duct to control the volume flow

3.1.4 Adjusting, control and safety devices

3.1.4.1
adjustable control thermostat
control thermostat that permits the user to obtain setting temperatures between a minimum and a maximum value

3.1.4.2
adjustable pressure regulator
pressure regulator fitted with a means of adjusting the downstream pressure

Note 1 to entry: This means is considered as an “adjusting device”.

3.1.4.3
automatic burner control system
system that comprises a programming unit and all the elements of a flame detector

Note 1 to entry: All the functions of an automatic burner control system may be assembled in one or more housings.

3.1.4.4
automatic valve
device that automatically opens, closes or varies a rate on a signal from the control circuit and/or the safety circuit

3.1.4.5
closure member
movable part of the valve or the thermoelectric device that opens, varies or shuts off the gas way

3.1.4.6
control knob
component intended to be moved by hand in order to act on a boiler control (tap, thermostat, etc.)

3.1.4.7
control thermostat
device enabling the water temperature to be kept automatically within a given range at a predetermined value

Note 1 to entry: This definition is dedicated to this standard and its scope, but correlates in principle with the definition of EN 60730-1:2011, 2.2.6, which reads "cycling temperature sensing control, which is intended to keep a temperature between two particular values under normal operating conditions and which may have provision for setting by the user ".

3.1.4.8
diaphragm
flexible component that operates the valve by means of a force resulting from a pressure difference

3.1.4.9
external soundness
soundness, with respect to the atmosphere, of an enclosure containing gas

3.1.4.10
fault tolerating time
time between the occurrence of a fault and the shut-down of the burner which is tolerated by the application without creating a hazardous situation

3.1.4.11
flame detector
device which detects and signals the presence of a flame. It may consist of a flame sensor, an amplifier and a relay for signal transmission

Note 1 to entry: These parts, with the possible exception of the actual flame sensor, may be assembled in a single housing for use in conjunction with a programming unit.

3.1.4.12
flame signal
signal given by the flame detector, normally when its sensor reacts to a flame

3.1.4.13
flame supervision device
device that, in response to a signal from the flame detector, keeps the gas supply open and shuts it off in the absence of the supervised flame

3.1.4.14
frost protection system
system that actively protects the water in the boiler against freezing

Note 1 to entry: An anti-freeze solution is not considered as an active frost protection system.

3.1.4.15
gas/air ratio control
device that automatically adapts the combustion air rate to the gas rate or vice versa

3.1.4.16
ignition interlock
part which prevents the operation of the igniter as long as the main gasway is open

3.1.4.17
internal soundness
soundness of a closure member in the closed position and isolating an enclosure containing gas from another enclosure or from the outlet of the valve

3.1.4.18
maximum allowable working temperature
temperature the material can withstand over a long period of time under working conditions

3.1.4.19
maximum water service pressure
maximum pressure permitted in the domestic water circuit of combinations boilers, as declared by the manufacturer

3.1.4.20
multi-functional control
device having at least two functions, one of which is a shut-off function, integrated in one housing, whereby the functional elements cannot operate if separated

3.1.4.21
nominal voltage
voltage or range of voltages stated by the manufacturer at which the boiler can operate normally

3.1.4.22
overheat cut-out device
device that causes safety shutdown and non-volatile lockout at a preset value before the boiler is damaged and/or before safety is put in question

Note 1 to entry: This definition is dedicated to this standard and its scope, but correlates in principle with the definition of EN 60730-1:2011, 2.2.8, which reads "temperature sensing control intended to keep a temperature below or above one particular value during abnormal operating conditions and which has no provision for setting by the user".

3.1.4.23
pressure regulator
device which maintains the downstream pressure constant to within fixed limits independent of variations, within a given range, of the upstream pressure and the gas rate

3.1.4.24
proportional control of the domestic hot water operation
means of control in which the gas rate is subordinated proportionally to the domestic hot water rate; the proportioning factor may be adjustable

3.1.4.25
recycling
automatic process by which, after loss of flame during operation, the gas supply is interrupted and the full start procedure is re-initiated automatically

3.1.4.26
remote control function
function providing automatic and normal operation by means of a control intended to be actuated with or without line of sight of the boiler e.g. through:

a) communication lines/protocols;

b) additional hardware and/or software;

c) ultra-sonic;

d) infra red (IR) / radio frequency (RF) transmission;

e) all kind of combinations of a) to c) via Internet using e.g. modems, portable telephones

3.1.4.27
remote control
device that performs the remote control function, by wires or wireless, with or without line of sight of the boiler

3.1.4.28
remote reset
device that performs a specific remote control function, being reset from lock-out to allow a restart attempt