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Ventilatorski gorilniki za tekoļa goriva

Automatic forced draught burners for liquid fuels

Automatische Brenner mit Gebläse für flüssige Brennstoffe

Brûleurs automatiques à air soufflé pour combustibles liquides

Ta slovenski standard je istoveten z: **EN 267:2009**

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Automatic forced draught burners for liquid fuels

Brûleurs automatiques à air soufflé pour combustibles liquides

Automatische Brenner mit Gebläse für flüssige Brennstoffe

This European Standard was approved by CEN on 5 October 2009.

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Foreword

This document (EN 267:2009) has been prepared by Technical Committee CEN/TC 47 “Atomizing oil burners and their components - Function - Safety - Testing”, 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of an identical text or by endorsement, at the latest by May 2010, and conflicting national standards shall be withdrawn at the latest by November 2011.

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 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 Annexes ZA, ZB and ZC, which are integral parts of this document.

This document supersedes EN 267:1999.

According to EN 267:1999 the following fundamental changes are given:

— inclusion of hazards by burners considered as machinery according to Directive 98/37/EC Machinery Directive and Directive 2006/42/EC Machinery Directive;

— additional requirements for burners in the scope with pressurised parts and/or firing pressurised bodies according to Directive 97/23/EC Pressure Equipment Directive (PED);

— in accordance with EN 676 requirements for electrical safety and industrial applications added;

— requirements for higher boiling petroleum based first raffinates added;

— standard structured as EN 676.

Following a request from CEN/TC 47, CEN has agreed to defer the date of withdrawal of EN 267:1999 for a transition period of 24 months.

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 the United Kingdom.

Introduction

This European Standard is primarily intended for automatic forced draught oil burners having a combustion air fan, operated with liquid fuels, and intended to be marketed as a complete assembly.

Forced draught oil burners according to this European Standard are often used in industrial applications. The safety principles are the same as for forced draught oil burners used for household/commercial applications. Industrial forced draught oil burners however need to operate safely in their industrial environment and the risks involved can differ from those for household applications. These industrial forced draught oil burners can be characterised by the ability to withstand industrial environmental influences, like moisture, high temperature, electrical and magnetic phenomena, vibrations, etc.

Special requirements for forced draught burners for industrial premises will be given as a note with the addition "Industrial application".

Further information and application limitations for forced draught burners, which are used for industrial application, are given in informative Annex H.

Principal requirements for installation of oil burners for industrial thermal processing are covered by EN 746-1 to -8.

This document is a type C standard as stated in EN ISO 12100-1 and EN ISO 12100-2.

The machinery concerned and the extent to which hazards, hazardous situations and hazardous events are covered are indicated in the scope of this document.

When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standard, for machines that have been designed and built according to the provisions of this type C standard.

1 Scope

This European Standard specifies the terminology, the general requirements for the construction and operation of automatic forced draught oil burners and also the provision of control and safety devices, and the test procedure for these burners.

This European Standard applies to automatic forced draught oil burners supplied with:

— a fuel having a viscosity at the burner inlet of 1,6 mm²/s (cSt) up to 6 mm²/s (cSt) at 20 °C; and

— higher boiling petroleum based first raffinates (viscosity greater than 6 mm^2/s), that require preheating for proper atomisation.

This European Standard is applicable to:

— single burners fitted to a single combustion chamber;

— single burners fitted to an appliance with additional requirements, then the relevant standard of this appliance shall be taken into account;

— single-fuel and dual-fuel burners when operating on oil only;

— the oil function of dual-fuel burners designed to operate simultaneously on gaseous and liquid fuels, in which case the requirements of EN 676 will also apply in respect of the gaseous fuel function.

This European Standard deals with all significant machine hazards, hazardous situations and events relevant to burners, when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer, see Annex J.

This European Standard also deals with the additional requirements for the burners in the scope with pressurised parts and/or firing pressurised bodies, see Annex K.

This European Standard specifies the requirements to be met by the manufacturer to ensure the safety during commissioning, start-up, operation, shut-down and maintenance.

This European Standard does not deal with hazards due to specific applications.

This European Standard is not applicable to automatic forced draught oil burners which are manufactured before the date of its publication as European Standard.

2 Normative references

The following referenced documents are indispensable for the application 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 230, *Automatic burner control systems for oil burners*

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

EN 676:2003+A2:2008, *Automatic forced draught burners for gaseous fuels*

EN 953, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

EN 1044, *Brazing — Filler metals*

EN 1057, *Copper and copper alloys — Seamless, round copper tubes for water and gas in sanitary and heating applications*

EN 1088:1995+A2:2008, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

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

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

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

EN 1254-1, *Copper and copper alloys — Plumbing fittings — Part 1: Fittings with ends for capillary soldering or capillary brazing to copper tubes*

EN 1254-4, *Copper and copper alloys — Plumbing fittings — Part 4: Fittings combining other end connections with capillary or compression ends*

EN 1854, *Pressure sensing devices for gas burners and gas burning appliances*

EN 10204, *Metallic products — Types of inspection documents*

EN 10220, *Seamless and welded steel tubes — Dimensions and masses per unit length*

EN 10305-1, *Steel tubes for precision applications — Technical delivery conditions — Part 1: Seamless cold drawn tubes*

EN 10305-2, *Steel tubes for precision applications — Technical delivery conditions — Part 2: Welded cold drawn tubes*

EN 10305-3, *Steel tubes for precision applications — Technical delivery conditions — Part 3: Welded cold sized tubes*

EN 10305-4, *Steel tubes for precision applications — Technical delivery conditions — Part 4: Seamless cold drawn tubes for hydraulic and pneumatic power systems*

EN 10305-5, *Steel tubes for precision applications — Technical delivery conditions — Part 5: Welded and cold sized square and rectangular tubes*

EN 10305-6, *Steel tubes for precision applications — Technical delivery conditions — Part 6: Welded cold drawn tubes for hydraulic and pneumatic power systems*

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

EN 15035, *Heating boilers — Special requirements for oil fired room sealed units up to 70 kW*

EN 15036-1:2006, *Heating boilers — Test regulations for airborne noise emissions from heat generators — Part 1: Airborne noise emissions from heat generators*

EN 50156-1:2004, *Electrical equipment for furnaces and ancillary equipment — Part 1: Requirements for application design and installation*

EN 60335-2-102:2005, *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, *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989)*

EN 60730-1, *Automatic electrical controls for household and similar use — Part 1: General requirements (IEC 60730-1:1999, modified)*

EN 61310-1, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, auditory and tactile signals (IEC 61310-1:2007)*

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 1127, *Stainless steel tubes — Dimensions, tolerances and conventional masses per unit length (ISO 1127:1992)*

EN ISO 4871, *Acoustics — Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)*

EN ISO 6806, *Plastics hoses and hose assemblies for suction and low-pressure discharge of petroleum liquids — Specification (ISO 6806:1992)*

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

EN ISO 9606-3, *Approval testing of welders — Fusion welding — Part 3: Copper and copper alloys (ISO 9606-3:1999)*

EN ISO 9606-4, *Approval testing of welders — Fusion welding — Part 4: Nickel and nickel alloys (ISO 9606-4:1999)*

EN ISO 9606-5, *Approval testing of welders — Fusion welding — Part 5: Titanium and titanium alloys, zirconium and zirconium alloys (ISO 9606-5:2000)*

EN ISO 11688-1:1998, *Acoustics — Recommended practice for the design of low-noise machinery and equipment — Part 1: Planning (ISO/TR 11688-1:1995)*

EN ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

EN ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles (ISO 12100-2:2003)*

EN ISO 13849-1, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2006)*

EN ISO 13857, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008)*

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 15609-2, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 2: Gas welding (ISO 15609-2:2001)*

EN ISO 15609-3, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 3: Electron beam welding (ISO 15609-3:2004)*

EN ISO 15609-4, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 4: Laser beam welding (ISO 15609-4:2009)*

EN ISO 15609-5, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 5: Resistance welding (ISO 15609-5:2004)*

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 15614-7, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 7: Overlay welding (ISO 15614-7:2007)*

EN ISO 15614-11, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 11: Electron and laser beam welding (ISO 15614-11:2002)*

EN ISO 23553-1, *Safety and control devices for oil burners and oil-burning appliances — Particular requirements — Part 1: Shut-off devices for oil burners (ISO 23553-1:2007, including Cor 1:2009)*

ISO 7-1, *Pipe threads where pressure-tight joints are made on the threads — Part 1: Dimensions, tolerances and designation*

ISO 1129, *Steel tubes for boilers, super heaters and heat exchangers — Dimensions, tolerances and conventional masses per unit length*

ISO 3183, *Petroleum and natural gas industries — Steel pipe for pipeline transportation systems*

ISO 8217, *Petroleum products — Fuels (class F) — Specifications of marine fuels*

ISO 9329-1, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 1: Unalloyed steels with specified room temperature properties*

ISO 9330-1, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 1: Unalloyed steel tubes with specified room temperature properties*

ISO 9330-2, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 2: Electric resistance and induction welded unalloyed and alloyed steel tubes with specified elevated temperature properties*

ISO 9330-3, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 3: Electric resistance and induction welded unalloyed and alloyed steel tubes with specified low temperature properties*

ISO 9330-4, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 4: Submerged arc-welded unalloyed and alloyed steel tubes with specified elevated temperature properties*

ISO 9330-5, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 5: Submerged arc-welded unalloyed and alloyed steel tubes with specified low temperature properties*

ISO 9330-6, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 6: Longitudinally welded austenitic stainless steel tubes*

ISO 23552-1, *Safety and control devices for gas and/or oil burners and gas and/or oil appliances — Particular requirements — Part 1: Fuel/air ratio controls, electronic type*

3 Terms and definitions

For the purposes of this document the terms and definitions of EN ISO 12100-1:2003 and the following apply.

3.1 General definitions

3.1.1
automatic forced draught burner
burner that is fitted with automatic ignition, flame monitoring and burner control devices

NOTE 1 Ignition, flame monitoring and the on/off switching of the burner occur automatically.

NOTE 2 The heat input of the burner can be adjusted during operation either automatically or manually.

3.1.2
semi-automatic oil burner
burner that differs from the fully automatic burner only in that start-up of the burner is initiated manually by the operating personnel and there is no automatic recycling after switching off the burner

3.1.3
dual-fuel burner
burner in which both gaseous and liquid fuels can be burnt either simultaneously or in succession

3.1.4
burners as a structural unit
individually operating burners that comprise all the devices necessary for operation such as oil atomising, air mixing and recirculating sections, where appropriate internal oil pre-heating devices including oil pressure pump in the case of oil pressure atomisers, combustion air fan (in the case of duo bloc-burners also the combustion air fan delivered separately) and flame detector devices, ignition device and the necessary valves for control and safety shut-down of the burner

3.1.5
industrial applications
the

- extraction,
- growth,
- refining,
- processing,
- production,
- manufacture or
- preparation

of materials, plants, livestock, animal products, food or artefacts

3.2 Fuel throughput and performance

3.2.1
throughput
constant mass of fuel consumed during one hour

NOTE Throughput is expressed in kilograms per hour (kg/h).

3.2.1.1
maximum throughput
mass of fuel consumed during one hour at the highest throughput stated by the manufacturer

NOTE Maximum throughput is expressed in kilograms per hour (kg/h).

3.2.1.2
minimum throughput
mass of fuel consumed during one hour at the lowest throughput indicated by the manufacturer

NOTE Minimum throughput is expressed in kilograms per hour (kg/h).

3.2.2
heat input
Q_F
quantity of energy used in unit time corresponding to the volumetric or mass flow rates, the calorific value used being either the net or gross calorific value

NOTE 1 Burners with fixed heat input or single stage burners have a single heat input.

NOTE 2 Range-rated burners have a maximum heat input and a minimum heat input declared by the manufacturer.

NOTE 3 Heat input is expressed in kilowatts (kW) or in kilograms/hour (kg/h) multiplied with the net calorific value (e.g. 11,86 kW h/kg).

3.2.2.1
maximum heat input
Q_{Fmax}
highest value of the heat input declared by the manufacturer

NOTE Maximum heat input is expressed in kilowatts (kW).

3.2.2.2
minimum heat input
Q_{Fmin}
lowest value of the heat input declared by the manufacturer

NOTE Minimum heat input is expressed in kilowatts (kW).

3.2.2.3
start heat input
Q_s
input of the burner during start-up position as a function of the maximum heat input

NOTE Start heat input is expressed in percent (%).

3.2.2.4
nominal heat input
Q_{FN}
value of the heat input declared by the manufacturer

NOTE 1 Fixed heat input or range-rated burners have a single nominal heat input.

NOTE 2 Range-rated burners can be adjusted between the maximum nominal heat input and the minimum nominal heat input stated by the manufacturer.

NOTE 3 Nominal heat input is expressed in kilowatts (kW).

3.3 Combustion chamber, burner head and test rig

3.3.1
pressure in the combustion chamber
p_F
pressure or depression, relative to atmospheric pressure, prevailing in the combustion chamber

NOTE Pressure in the combustion chamber is expressed in kilopascals (kPa).

3.3.2
length of the combustion chamber
l

distance between the face of the nozzle or the fuel outlet and the rear wall of the test flame tube or combustion chamber

NOTE Length of the combustion chamber is expressed in millimetres (mm).

3.3.3
combustion chamber
part of the appliance in which the combustion takes place

3.3.4
burner head
mixing device consisting of an atomizing system (s) and other components for the mixing of air and fuel, e.g. stabilizing disc, blast tube

3.3.5
test rig
combustion chamber defined by the manufacturer

NOTE In the case where the manufacturer has not defined a combustion chamber, the test is carried out on test rigs with the test flame tubes according to 5.3.

3.4 Composition of the gaseous combustion products

3.4.1
CO_2 content
quantity of carbon dioxide (CO_2) in the dry gaseous products expressed as a proportion of the total volume

NOTE CO_2 content is expressed in percent (%).

3.4.2
O_2 content
quantity of oxygen (O_2) contained in the dry gaseous products, expressed as a proportion of the total volume

NOTE O_2 content is expressed in percent (%).

3.4.3
CO content
quantity of carbon monoxide (CO) in the dry gaseous combustion products, measured as volumetric ml/m³

NOTE CO content is expressed in milligrams per kilowatt hour (mg/kWh).

3.4.4
content of nitrogen oxide
quantity of nitrogen oxide (NO and NO_2) in the dry gaseous combustion products, measured as volumetric ml/m³, calculated as NO_2

NOTE Content of nitrogen oxide is expressed in milligrams per kilowatt hour (mg/kWh).

3.4.5
content of unburned hydrocarbons
quantity of unburned hydrocarbons in the wet gaseous combustion products, measured as volumetric ml/m³, calculated as C_3H_8

3.4.6
smoke number
sample reference, the shade of which is closest to that of the test mark

NOTE See Annex A.

3.4.7
air figure
λ
ratio between the effectively introduced quantity of air and the theoretically required quantity of air

3.5 Adjusting, control and safety devices

3.5.1
flame detector device
device by which the presence of a flame is detected and signalled

NOTE It can consist of a flame sensor, an amplifier and an element for signal transmission. 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.

3.5.2
automatic burner control system
system which comprises at least a programming unit and all the elements of a flame detector device

NOTE The various functions of an automatic burner control system can be in one or more housings.

3.5.3
programming unit
programming unit reacts to signals from control and safety devices, gives control commands, controls the start-up sequence, supervises the burner operation and causes controlled shut-down, and if necessary safety shut-down and non-volatile lock-out

NOTE The programming unit follows a predetermined sequence of actions and always operates in conjunction with a flame detector device.

3.5.4
safe start check
procedure employing a protection circuit or circuits, to establish whether or not a fault in a safety system or a flame simulating condition exists prior to start-up

3.5.5
controlled shut-down
process by which the power to the fuel shut-off valve(s) is immediately removed before any other action takes place, e.g. as a result of the action of a controlling function

3.5.6
non-volatile lock-out
safety shut-down condition of the system, such that a recycling can only be accomplished by a manual reset of the system and by no other means