

**PUHURPÕLETID GAASKÜTUSTELE**

**Forced draught burners for gaseous fuels**



## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN 676:2020 sisaldab Euroopa standardi EN 676:2020 ja selle paranduse AC:2022 ingliskeelset teksti.	This Estonian standard EVS-EN 676:2020 consists of the English text of the European standard EN 676:2020 and its corrigendum AC:2022.
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English Version

## Forced draught burners for gaseous fuels

Brûleurs à air soufflé pour combustibles gazeux

Gebläsebrenner für gasförmige Brennstoffe

This European Standard was approved by CEN on 9 October 2019.

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## European foreword

This document (EN 676:2020) has been prepared by Technical Committee CEN/TC 131 “Gas burners using fans”, 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of an identical text or by endorsement, at the latest by July 2020 and conflicting national standards shall be withdrawn at the latest by January 2023.

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 will supersede EN 676:2003+A2:2008.

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 and ZB, which are an integral part of this document.

Compared to EN 676:2003 and its amendments A1 and A2 the following fundamental changes have been made:

- a) based on ISO 22967 where different to EN 676 such as:
  - 1) update of definitions;
  - 2) test rig < 2,4 MW and > 2,4 MW;
  - 3) electrical interfaces for burners;
- b) modification:
  - 4) replacement of EN 50156-1 by EN 60204-1 to include international available requirements for the electrical safety of machines; see Annex L with editorial allocation in Annex K;
  - 5) Annex J is adapted to the new EN ISO 12100 which is substituting EN 292 which is currently referenced to in Table J.1;
  - 6) normative formulation of Annex A 'Combustion characteristics';
- c) new functions / requirements:
  - 7) remote reset;
  - 8) environmental aspects (environmental checklist);
  - 9) increase of burner efficiency;
  - 10) terminology for burner load control;
  - 11) implementing new requirements to comply with the 2013/813 (ErP);

- 12) requiring of a risk assessment as required by EU Directives 2014/35/EU for LVD and EU Regulation 2016/426 for GAR.

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, Turkey and the United Kingdom.

## Introduction

This document is primarily intended for forced draught gas burners having a combustion air fan, operated with gaseous fuels, and intended to be marketed as a complete assembly.

EN 437 sets out a system of classification of appliances into categories defined according to the gases and pressures for which they are designed.

Such a system of classification, when applied to forced draught burners, can lead to difficulties in defining the precise category to which a particular burner should be allocated. For example many burners are designed to operate on a wide range of fuel gases with little or no modification other than adjustment of air supply.

The technical committee responsible for the standard decided that the following appliance categories for forced draught burners should apply:

- single categories: I<sub>2R</sub> for natural gas and I<sub>3R</sub> for liquefied petroleum gas;
- dual category: II<sub>2R/3R</sub> for natural and liquefied petroleum gas.

All the burners of this standard marked with these categories are commissioned on site and the measured values are recorded in a commissioning report.

However it should be noted that the Gas Appliance Directive requires the specification of the type of gas and the supply pressure used as well as the burner category.

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

Principal requirements for installation and construction of gas burners used in industrial thermal processes are covered by EN 746-2 *Industrial thermoprocessing equipment — Safety requirements for combustion and fuel handling systems*.

Special requirements for forced draught burners for industrial premises will carry a prefix, “Industrial application”.

Further information and application limitation for EN 676 forced draught burners which are used for industrial application are given in informative Annex I.

This document is a type C standard as stated in EN ISO 12100.

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 document specifies the terminology, the general requirements for the construction and operation of forced draught gas burners and also the provision of control and safety devices, and the test procedure for these burners.

This document is applicable to:

- automatic gas burners with a combustion air fan (hereinafter called “burners”) and gas line components, intended for use in appliances of different types, and that are operated with gaseous fuels;
- pre-mixed burners and nozzle mixed burners;
- single burners with a single combustion chamber;
- single-fuel and dual-fuel burners when operating only on gas;
- the gas function of dual-fuel burners designed to operate simultaneously on gaseous and liquid fuels, which, for the latter, the requirements of EN 267 also apply.

This document 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, see Annex J.

This document specifies the requirements to ensure the safety during commissioning, start-up, operation, shut-down and maintenance.

This document does not apply to burners specifically designed for use in industrial processes carried out on industrial premises.

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

This document deals also with forced draught burners intended to be used with biogenous gaseous fuels, mixtures with line-conveyed gas and special gaseous fuels.

This document deals also with burners and their equipment to increase the total appliance efficiency, see Annex M.

## 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 88-2:2007, *Pressure regulators and associated safety devices for gas appliances — Part 2: Pressure regulators for inlet pressures above 500 mbar up to and including 5 bar*

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 267, *Forced draught burners for liquid fuels*

- EN 298:2012, *Automatic burner control systems for burners and appliances burning gaseous or liquid fuels*
- EN 334:2005+A1:2009, *Gas pressure regulators for inlet pressures up to 100 bar*
- EN ISO 14120:2015, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards (ISO 14120:2015)*
- EN 1092-1:2007+A1:2013, *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 1643:2014, *Safety and control devices for gas burners and gas burning appliances — Valve proving systems for automatic shut-off valves*
- EN 1854:2010, *Pressure sensing devices for gas burners and gas burning appliances*
- EN 10204:2004, *Metallic products — Types of inspection documents*
- EN 10216-1:2013, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 1: Non-alloy steel tubes with specified room temperature properties*
- EN 10217-1:2002+A1:2005, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 1: Non-alloy steel tubes with specified room temperature properties*
- EN 10220:2002, *Seamless and welded steel tubes — Dimensions and masses per unit length*
- EN 12067-2:2004, *Gas/air ratio controls for gas burners and gas burning appliances — Part 2: Electronic types*
- EN 12516-3:2002, *Valves — Shell design strength — Part 3: Experimental method*
- EN 13611:2015, *Safety and control devices for burners and appliances burning gaseous and/or liquid fuels — General requirements*
- EN 15036-1:2006, *Heating boilers — Test regulations for airborne noise emissions from heat generators - Part 1: Airborne noise emissions from heat generators*
- EN 50156-1:2015, *Electrical equipment for furnaces and ancillary equipment — Part 1: Requirements for application design and installation*
- EN 60204-1:2006, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2005, modified)*
- EN 60335-2-102:2016, *Household and similar electrical appliances — Safety — Part 2-102: Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections*
- EN 60529:1991, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*
- EN 60529:1991/A1:2000, *Degrees of protection provided by enclosures (IP Code) (IEC 60529/A1:1999)*

EN 60529:1991/A2:2013, *Degrees of protection provided by enclosures (IP Code) (IEC 60529/A2:2013)*

EN 60730-1:2011, *Automatic electrical controls for household and similar use — Part 1: General requirements*

EN 61310-1, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, acoustic and tactile signals*

EN 62061:2011, *Safety of machinery — Functional safety of safety-related electrical, electronic and programmable electronic control systems*

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)*

EN ISO 3166-1, *Codes for the representation of names of countries and their subdivisions — Part 1: Country codes (ISO 3166-1:2013)*

EN ISO 3183:2012, *Petroleum and natural gas industries — Steel pipe for pipeline transportation systems (ISO 3183:2012)*

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

EN ISO 9606-1:2013, *Qualification testing of welders — Fusion welding — Part 1: Steels (ISO 9606-1:2012 including Cor 1:2012)*

EN ISO 9606-2:2004, *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 9606-5:2000, *Approval testing of welders — Fusion welding — Part 5: Titanium and titanium alloys, zirconium and zirconium alloys (ISO 9606-5:2000)*

EN ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100:2010)*

EN ISO 13849-1:2015, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2015)*

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

EN ISO 14119:2013, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection (ISO 14119:2013)*

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

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

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

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

EN ISO 15609-5:2011, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 5: Resistance welding (ISO 15609-5:2011, Corrected version 2011-12-01)*

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

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

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

ISO 7-1:1994, *Pipe threads where pressure-tight joints are made on the threads — Part 1: Dimensions, tolerances and designation*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

#### 3.1 General terms and definitions

##### 3.1.1

##### **forced draught burner**

burner in which the total air for combustion is supplied by means of a fan

##### 3.1.2

##### **automatic forced draught burner**

burner that is fitted with an automatic ignition, flame monitoring and burner control devices where the ignition, flame monitoring and the on/off switching of the burner occurs automatically

Note 1 to entry: The heat input of the burner can be adjusted during operation either automatically or manually.

##### 3.1.3

##### **dual-fuel burner**

burner in which both gaseous and liquid fuels can be burnt either simultaneously or in succession