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# Automatic forced draught burners for gaseous fuels

Brûleurs automatiques à air soufflé pour combustibles gazeux

Automatische Brenner mit Gebläse für gasförmige Brennstoffe

This draft amendment is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 131.

This draft amendment A2, if approved, will modify the European Standard EN 676:2003. If this draft becomes an amendment, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for inclusion of this amendment into the relevant national standard without any alteration.

This draft amendment was established by CEN 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 Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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# Foreword

This document (EN 676:2003/prA2:2005) has been prepared by Technical Committee CEN/TC 131 “Gas burners using fans”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

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 Annex ZC, which is an integral part of this document.

# ANNEX J
(normative)

# Additional requirements for burners with pressurised parts and burners with monitoring devices firing pressurised equipment as defined in Pressure Equipment (PED) Directive 97/23/EC

EN 676:2003 applies with the following supplements or modifications of the corresponding clauses.

## J.1 Scope

*according to clause 1 and addition:*

For piping this amendment applies only for pressurised parts and accessories with a product of the maximum allowable pressure PS and the diameter DN between 100 and 350 mm of less than 3 500 bar mm (category II) or with a product of PS and DN between 25 and 100 mm of less than 1 000 bar mm (category I), as defined by EU directive 97/23/EC.

Additional electrical functional requirements are given for monitoring devices.

The risk philosophy adopted in this standard is based on the analysis of hazards on account of pressure. The standard applies to the principals to eliminate or reduce hazards and where they can not be eliminated appropriate protection measures shall apply.

Any residual hazards are identified and communicated to the user where appropriate.

Depending on the installation situation additional requirements may apply to cover the risks arising from traffic, wind, earthquake loading and external fire.

## J.3 Terms and definitions

### J.3.2.3 Gas line components

*according to clause 3.2.3 and addition:*

**J.3.2.3.5**
**pressurised parts**
piping components and devices having pressure bearing housings with a pressure greater than 500 mbar

NOTE See EU Directive 97/23/EC

**J 3.2.3.6**
**means for draining and venting**
devices to allow harmless draining and venting of the pressurised fuel supply lines

**J.3.2.4.18**
**monitoring devices**
devices used for monitoring and controlling the burner when firing pressurised equipment

### J 4.2.1 Design

*according to clause 4.2.1 and addition:*

The design of the burner shall be based on the intended life time declared by the manufacturer. The intended life time of the equipment shall be taken into account.

The pressure equipment shall be properly designed taking all relevant factors into account in order to ensure that the equipment will be safe throughout its intended life.

The design shall incorporate appropriate safety coefficients using comprehensive methods which are known to incorporate adequate safety margins against all relevant failure modes in a consistent manner.

NOTE The life time of the components may differ from the life time of the burner.

### J 4.2.4 Materials

*according to clause 4.2.4 and addition:*

If the pressurised parts carry aggressive media, the materials used shall be resistant to this media.

### J 4.2.7 pressurised parts

### J 4.2.7.1 Design

Pressurised parts shall be designed for loadings appropriate to their intended use and other reasonably foreseeable operating conditions.

Pressurised parts shall withstand a pressure strength test according to J.5.9.1.

### J 4.2.7.2 Materials

Materials of pressurised parts, which are subject to a maximum allowable pressure > 0,5 bar, shall be suitable for the intended lifetime unless replacement is foreseen. Such materials shall be verified according to the following requirements:

Materials

— shall comply with harmonised standards (see table K.1), or

— shall be covered by a European approval of pressure equipment materials (e.g. EN 13840), or

— shall be subject of a particular material appraisal.

Materials used in similar applications under similar operating conditions, which have been recognised as being safe to use before 29 November 1999 may also be regarded as suitable. The safety of pressurised parts using such materials shall be verified in combination with the design assessment according to J.4.2.7.1.

The equipment manufacturer shall take appropriate measures to ensure that the material used conforms with the required specification. In particular, documentation prepared by the material manufacturer affirming compliance with a specification shall be obtained for all materials.

For the main pressure-bearing parts of equipment in category II, this shall take the form of a certificate of specific product control.

NOTE 1 For a list of materials used for the construction of pressure equipment and recognised as being safe to use before 29 November 1999, see table K.2 and K.3.

**J.4.2.7.3 Permanent joints**

Permanent joints and adjacent zones must be free of any surface or internal defects detrimental to the safety of the equipment.

The properties of permanent joints must meet the minimum properties specified for the materials to be joined unless other relevant property values are specifically taken into account in the design calculations

For pressure equipment, permanent joining of components which contribute to the pressure resistance of equipment and components which are directly attached to them must be carried out by suitably qualified personnel according to suitable operating procedures

**J.4.3.2 Electrical safety**

all electrical equipment and connections of the burner shall comply with the requirements of EN 50156-1,unless otherwise specified in this annex.

**J 4.3.4.1 General**

*according to clause 4.3.4.1 and addition*

All gas line components shall be assembled and mounted without bending, torque and other mechanical stress.

All gas line components used as pressurised parts shall comply with the PED or its mandated standards gas line components at a pressure > 0,5 bar up to 4 bar shall be designed up to DN 50 with threads of 2 inches or flanges. Larger dimensions shall be flanged

All gas line components shall be protected against possible flashback by appropriate means.

All gas line components in case of aggressive gases shall be made of materials for appropriate lifetime. The manufacturer shall declare periods of service and maintenance and declare appropriate lifetime or cycles to maintain safety.

**J.4.3.4.4 gas pressure governor**

The gas pressure governor shall comply with prEN 88-2 as pressure bearing part.

**J.4.3.4.5 High gas pressure over load protection device**

The high gas pressure over load protection device shall comply with EN 1854/ and fitted as monitoring device for fired pressurized bodies and pressure bearing part.

**J.4.3.4.6 Low gas pressure protection device**

The low gas protection device, if used, shall comply with EN 1854 and fitted as monitoring device for fired pressurized bodies and a pressure bearing part.

**J 4.3.4.8 automatic safety shut-off valve**

All burners shall be fitted with two automatic safety shut-off valves class A according to EN 161 as a pressure bearing part in series according to 4.3.4.8 and addition to table 1:

— If aggressive gases are used, the equipment in table 1 of > 1200 kW shall apply.

**J.4.3.4.11 air proving device**

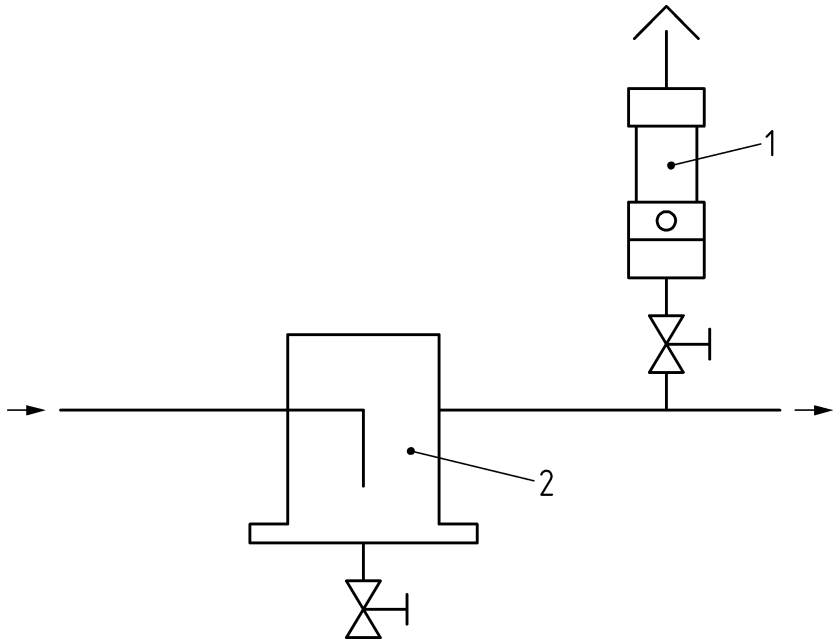
The burner shall be fitted with a device for proving adequate air flow during the pre-purge, ignition and operation of the burner. If a pressure sensing device is used it shall comply with EN 1854 as being a monitoring device for fired pressurized bodies.

**J.4.3.4.14 automatic burner control system**

The automatic burner control system as being a monitoring device for fired pressurized bodies shall comply with the requirements of EN 298 and > 1200 kW burner output it shall have a permanent operation mode.

**J 4.3.4.16 means for draining and venting**

Gas lines shall be equipped with devices for harmless draining and venting under pressure. These devices shall be located upstream the safety shut-off valves (see figure J.1).




**Key**

1 means for venting

2 mean for draining

**Figure J.1 — Devices for draining and venting**

**J 4.4.1 General functions requirements**

The following functions of the burner shall be designed according to EN 50156-1 as equivalence to maintain safety integrity level 3 (SIL-class 3):

— pressure control;

— burner control and flame detection;

— safe shut off of the gas supply;

— air/fuel ratio control;

— integration of the superior safety equipment of the boiler and of the firing system.

The requirements of the construction, see J.4.4.1.11.

The requirements of the safety life cycle, see J.4.4.1.12.

**J 4.4.1.10 external safety limiter**

The operation of an external safety limiter (e.g. safety accessories of the pressure vessel as water level limiters, pressure sensing devices, etc.) as being a safety accessories shall cause at least a non volatile lockout of the burner.

**J.4.4.1.11 Design according to EN 50156-1**

The equipment of the following paragraphs is considered to be an equivalence to the requirements of SIL-Class 3 of the EN 50156-1.

Alternative equipment has to comply with EN 50156-1 and has to maintain SIL-Class 3, and to prove it.

NOTE 1 Fulfilling a specific SIL class implies fulfilling a fault assessment according EN 50156-1:2005, cl.10.5

NOTE 2 Other SIL-classes may be applicable, if this is based on a risk assessment according EN 50156-1.

**J.4.4.1.11.1 Pressure control**

The pressure control shall be designed according to J 4.3.4.5 and J 4.3.4.11.

**J.4.4.1.11.2 Burner control and flame detection**

The burner control and the flame detection shall be designed according to J.4.3.4.14 and EN 298.

**J.4.4.1.11.3 Safe shut off of the gas supply**

The safe shut off of the gas supply shall be designed according to J.4.3.4.8.

A valve proving system according to EN 1643 is required.

**J.4.4.1.11.4 Air/fuel ratio control**

Mechanical air-/gas ratio controls shall be operated by mechanical feed and shall be designed in such a way that the ratio is not inadmissible influenced by interference and operation effects.

Pneumatic air-/gas ratio controls shall be designed according to EN 12067-1.

Electronic air-/gas ratio controls shall be designed according to EN 12067-2.

**J.4.4.1.11.5 integration of the superior safety equipment of the boiler and of the firing system**

The signal processing of superior safety equipment of the boiler shall be designed according to. EN 50156-1:2005, figure 10 or figure 11, see J.4.4.1.10.

#### J.4.4.1.12 Consideration: Safety Life Cycle

In figure J.2 the safety life cycle for the application and installation of a protective system of a burner according to this standard is demonstrated.

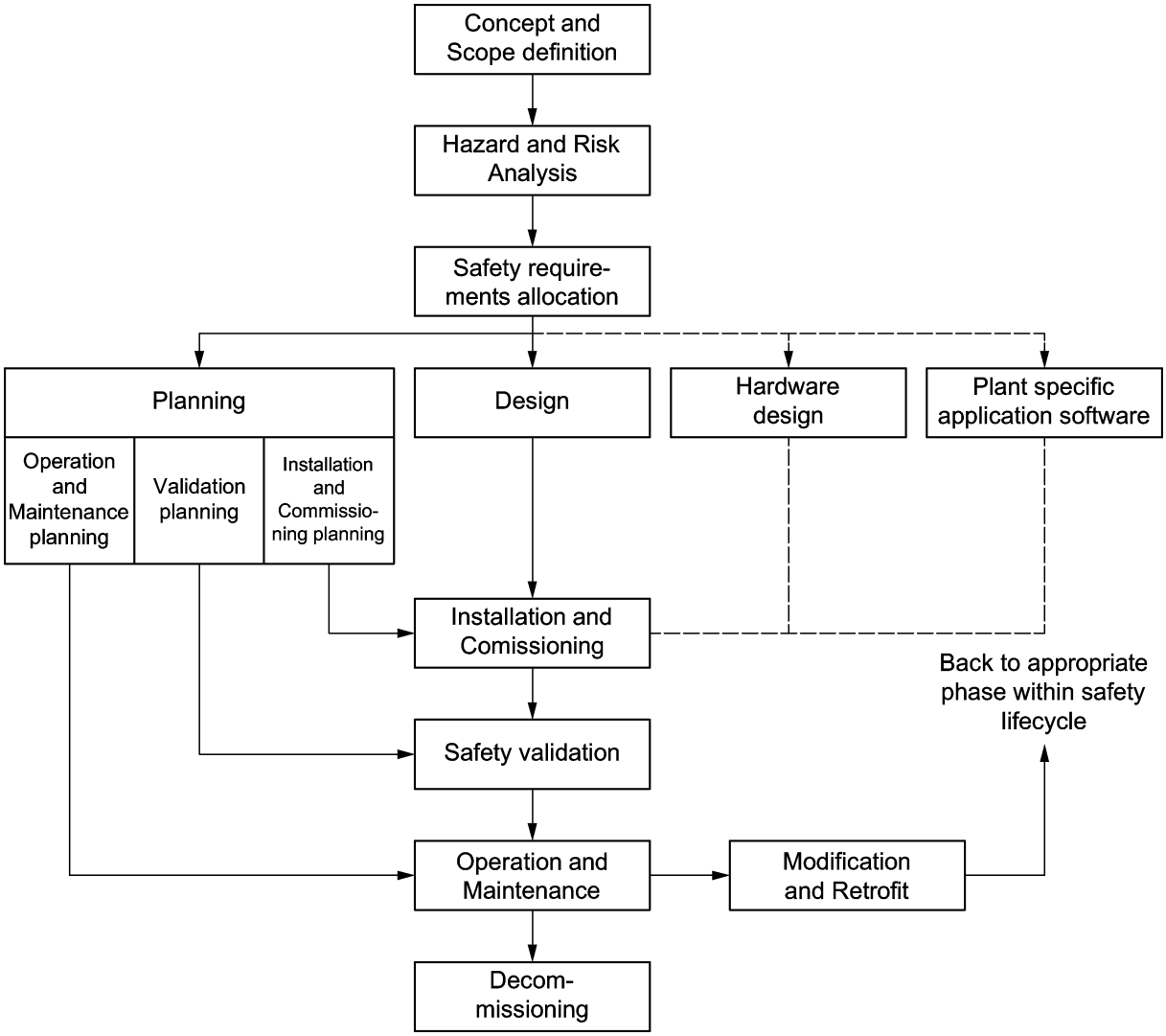



**Figure J.2 — Safety life cycle for the burner**

## J.5 test methods

*according to clause 5 and addition* :

### J 5.9 Pressurised Parts

#### J 5.9.1 Component Design Pressure Strength Test

The pressure strength test shall be performed by using a safety factor *f* for the test pressure where *f* is the multiplication factor for the maximum inlet pressure.

If not otherwise defined by harmonised design standards, a safety factor for the design *f* = 2.5 shall be considered.