

SLOVENSKI STANDARD

SIST EN 230:2000

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Monobloc oil burners - Safety, control and regulation devices and safety times

Ölzerstäubungsbrenner in Monoblockausführung - Einrichtungen für die Sicherheit, die Überwachung und die Regelung sowie Sicherheitszeiten

Bruleurs a fioul a pulvérisation de type monobloc - Dispositifs de sécurité, de commande et de régulation et temps de sécurité

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EUROPEAN STANDARD

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English version

Monobloc oil burners - Safety, control and regulation devices and safety times

Brûleurs à fioul à pulvérisation de type monobloc - Dispositifs de sécurité, de commande et de régulation - Temps de sécurité

Ölzerstäubungsbrenner in Monoblockausführung - Einrichtungen für die Sicherheit, die Überwachung und die Regelung sowie Sicherheitszeiten

STANDARD PREVIEW

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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Foreword

This European Standard was drawn up by the Technical Committee CEN/TC 47 "Atomizing oil burners and their components - Function - Safety - Testing", the Secretariat of which is held by DIN.

According to the Common CEN/CENELEC Rules, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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1 Scope and field of application

This European Standard determines the requirements, operating conditions and test methods for safety, control and regulation devices for automatic and semi-automatic atomizing burners of the monobloc type for burning distillates and residual fuels, in the range from kerosene to heavy fuel oils.

It also applies to dual fuel burners, for use with either oil or gaseous fuels, when operating on oil.

It does not however give any requirement relating to electrical safety which will be dealt with in the publications of other standardization bodies.

2 Normative references

- CENELEC Harmonization Document HD 251 S3
"Safety of household and similar electrical appliances,
Part 1: General requirements"
- CENELEC Harmonization Document HD 419
"Low-voltage switch-gear and control-gear, contactors"
- CENELEC Harmonization Document HD 420
"Control switches (low-voltage switching-devices for control and auxiliary
circuits, including contactor relays)"
- CENELEC Harmonization Document HD 365 S3
"Classification of degrees of protection provided by enclosures"
- prEN 267 "Atomizing oil burners of monobloc type; testing"
(final draft - October 1990)

3 Definitions

Definitions for burners and regulation devices are given in the annex.

3.1 Supervision and control devices

These concern all or part of the following apparatus:

3.1.1 Flame detector: Apparatus for signalling to the control device the non-establishment, existence and extinction of the flame. It is generally constituted by a sensing element (possibly connected to an amplifier) and delivers a signal.

3.1.2 Burner control unit: Device which starts and stops the burner, according to a pre-set programme, in response to the command from the regulating, supervising or limiting devices. Certain elements of the flame detector may be incorporated in the burner control unit (e.g. amplifier with relay).

3.2 Burner ignition systems

3.2.1 Automatic electrical ignition: System in which the fuel is ignited using only electrical energy.

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3.2.1.1 Ignition by controlled spark: System which allows the fuel to be released only when the presence of the ignition spark has been proven.

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3.2.1.2 Ignition by non-controlled spark: System in which the fuel may be released when the ignition spark is not controlled.

3.2.2 Automatic ignition with liquid or gaseous fuel: System by which the fuel is ignited by a pilot burner using liquid or gaseous fuel ; the operation of the pilot burner may be either permanent or intermittent.

Permanent pilot burners may be operated manually.

Intermittent pilot burners are operated automatically.

3.2.2.1 Ignition by controlled pilot burner: System which allows the main fuel to be released only when the flame of the ignition burner is present.

3.2.2.2 Ignition by non-controlled pilot burner: System in which the release of the main fuel is not prevented by the absence of the flame of the pilot burner.

3.3 Conditions for burner shut-down

3.3.1 Controlled shut-down: Operation initiated by the action of a regulator, automatic limit device or a timing device (time switch).

3.3.2 Safety lock-out: Operation initiated by the action of a flame detector, as a result of abnormal operating conditions described in clause 5.

This results in the immediate shut-off of the fuel supply and locking-out of the burner control unit.

3.3.3 Safety shut-down: Operation initiated by the action of a limiter (e.g. pressure, temperature, water level, atomizing agent or combustion air limiter).

It interrupts the operation of the burner as for a controlled shut down. The limiter itself shall however comply with the requirements defined in the annex (see A 1.2.2.2 and A 1.2.2.3).

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3.3.4 Lock-out: Shut-down condition of the burner control unit such that re-start cannot be achieved without manual intervention.

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3.3.5 Ignition-restoration: Operation by which the fuel is re-ignited after the extinction of the flame during operation without the fuel supply being interrupted.

3.3.6 Re-start: Operation by which the starting process is repeated, after the extinction of the flame during operation. When re-start takes place, the stipulated sequences of the control programme shall be adhered to.

3.4 Safety times and operating sequences (see diagram in annex)

3.4.1 Total ignition time: Period during which the ignition device is in operation. Pre-ignition, actual ignition and post-ignition times make up the total ignition time.

3.4.1.1 Pre-ignition time: Period between the start of the ignition cycle and the release of the fuel.

3.4.1.2 Ignition time: Period between the release of the fuel and the first appearance of the flame.

3.4.1.3 Post-ignition time: Period between the first appearance of the flame and the shut-off of the ignition device.

3.4.2 Safety time: Duration of the maximum permissible time during which the burner control unit allows the fuel to be released without there being a flame.

Distinction shall be made for safety times, according to whether the resultant safety shut-down is due to a fault during ignition or during normal operation.

3.4.2.1 Ignition safety time: Time starting from the signal for release of the fuel and terminating at the moment at which the signal for interrupting the fuel supply is given.

3.4.2.2 Safety time during operation: Time starting at the moment the flame is extinguished and ending at the moment the signal for interrupting the fuel supply is given.

3.4.3 Flame simulation: Signal indicating the existence of a flame when no flame is present.

NOTE: For protection against flame simulation and spurious light (see paragraph 5.2).

(Applicable only in the case of systems with flame detection by a constant level of illumination).

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3.4.4 Purge time: Period during which the combustion chamber is compulsorily ventilated without any fuel being supplied.

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3.4.4.1 Pre-purge time: Period immediately preceding the release of fuel.

3.4.4.2 Post-purge time: Period immediately following the cutting-off of the fuel supply.

3.4.5 Operational state: State commencing with the presence of flame after the permissible ignition safety time has expired; it is the end of the starting process. Starting is, however, not considered to have taken place if the fuel release is not authorized or if it is interrupted after expiry of the safety time by the lock-out of the burner control unit.

3.4.6 Intermittent operation: State of operation the duration of which does not exceed 24 h.

3.4.7 Continuous operation: State of operation the duration of which exceeds 24 h.

3.5 Nominal fuel throughput (see clauses 4 and 5)

Fuel throughput of the burner, expressed in kg/h.

4 Safety times and operational sequences

4.1 General

The safety times given below are maximum permissible values under normal operating conditions (rated voltage U_N and ambient temperature approximately 20 °C).

Safety times

Nominal fuel throughput kg/h	Safety time max. (s)	
	at ignition	during operation
Up to and including 30	10	10
above 30	5	1

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It is permitted, however, under limit operating conditions (voltage between 0.85 and 1.1 U_N at ambient temperatures between 0°C and 60 °C) that the safety times given in the table may be increased by 100 % for burners with nominal throughput up to and including 30 kg/h and by 25 % for burners with nominal throughput in excess of 30 kg/h.

For burners with a nominal throughput equal to or less than 30 kg/h not provided with pre-purge, or where the pre-purge is less than 5 s, the safety times may be increased without however exceeding 20 s under limit operating conditions.

4.2 Operation of the burner under extreme conditions

Burner control units shall be protected against low voltage supply. Extreme voltage drop shall not endanger the operation of the installation.

If, depending on the place where they are to be installed, the burner control units may be subjected to temperatures of less than 0°C or greater than 60°C, only those units which are specified by the manufacturers for satisfactory operation at these temperatures shall be used.

4.3 Adjustment of the ignition safety times and safeguards against mal-adjustment.

Adjustment of the ignition safety times shall be carried out in the factory. Any alteration to the setting shall only be possible with the aid of a tool. Any alteration of the initial setting shall be clearly evident.

4.4 Flame detector

The instructions for use shall indicate how to measure the value of the flame detector signal.

4.5 Prepurge time

The requirements of prEN 267¹⁾, sub-clause 5.5, shall be met.

The electric ignition device shall be operating from the start of pre-purge period.

This requirement is not applicable to burners:

- either fitted with a device which during the pre-purge period prevents the operation of the ignition means when the fuel pressure upstream of the shut-off valve does not exceed 20 % of the atomizing pressure,
- or fitted with two shut-off valves in series,
- or mounted on generators which are subject to special requirements such as ovens, kilns, air heaters, steam boilers or used in multiburner installations.

Finally, the electric ignition device for gas-fired pilot burners shall not be energised during the pre-purge time.

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4.6 Ignition by pilot burner (see also operating examples in annex)

The maximum calorific output of any pilot burner shall not exceed 10 % of the calorific output of the main burner.

4.6.1 Ignition by non-supervised gas-fired pilot burner

If an ignition system incorporating a non-supervised gas-fired pilot burner is used, the period during which the supply of fuel to the pilot burner is allowed shall not exceed 5 s. This period is limited by the signal for releasing the fuel to the pilot burner and the main burner. In addition, the electrical ignition device of the pilot burner shall not assist in the ignition of the main burner.

4.6.2 Ignition by supervised gas-fired pilot burner

If an ignition system incorporating a supervised pilot burner is used, the supply to the pilot burner valve(s) shall be interrupted if the pilot burner flame has not been established within 5 s. The supply of fuel to a permanent pilot burner shall be cut off within 5 s of the pilot burner flame having been extinguished as a result of a malfunction.

¹⁾ Final draft prEN 267, October 1990.

This reference will be modified when EN 267 is published.

4.6.3 Ignition by oil-fired pilot burner

The requirements of 4.6.1 and 4.6.2 also apply to oil fired pilot burners. For the periods during which these burners are allowed to be in operation without a flame being present, the values contained in the table in clause 4.1 with reference to the nominal fuel throughput of the pilot burner are applicable.

4.7 Post-ignition

For burners with a fuel throughput equal to or less than 30 kg/h, the post ignition period may be extended during the operating period of the burner provided that the flame detector is not affected by the ignition system.

5 Supervision and control devices

5.1 Re-ignition, re-starting and shut-down after flame extinction

5.1.1 Safety shut-down of burners with a throughput of up to 30 kg/h inclusive

For burners with a throughput up to and including 30 kg/h, the fuel supply shall be automatically cut off and safety shut-down shall occur not later than at the end of the safety time, if:

- a) during burner start-up, a flame has not been established on expiry of the safety time
- b) the flame is extinguished during operation and its presence is not apparent at the end of the safety shut-down period during the following automatic re-ignition cycle. Re-ignition of the burner or shut-down of the fuel supply prior to an attempt at re-ignition shall take place not later than 1 s after the loss of flame.

A re-start of the burner shall not be possible until the burner control unit has been manually reset.

5.1.2 Safety shut-down of burners with a throughput in excess of 30 kg/h

For burners with a throughput in excess of 30 kg/h, the fuel supply shall be automatically cut off and safety shut-down shall occur not later than at the end of the safety time, if:

- a) during burner start-up, no flame had been established at the end of the safety time.
- b) the flame is extinguished during operation. In this case, one attempt at re-ignition may be made if the fuel supply to the burner has been cut off within 1 s of flame extinction.

A re-start of the burner shall not be possible until the burner control unit has been manually reset.