

Methods of test for

Atomizing oil burners of the monobloc type

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National foreword

This British Standard has been prepared under the direction of the Refrigeration, Heating and Air Conditioning Standards Policy Committee and is the English language version of EN 267:1991 “*Atomising oil burners of monoblock type — Testing*”, published by the European Committee for Standardization (CEN).

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This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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English version

Atomizing oil burners of monobloc type — Testing

Brûleurs à fioul à pulvérisation de type
monobloc — Essais

Ölzerstäubungsbrenner vom Typ
Monoblock — Prüfungen

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European Committee for Standardization
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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, being part of the Internal Regulations of CEN, 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 Object and field of application

This European Standard specifies the test requirements and methods for laboratory testing of atomizing oil burners of the monobloc type, with a flow rate $m \leq 100$ kg/h and supplied with a fuel having a viscosity at the burner input point of $(5,5 \pm 0,5)$ mm²/s at 20 °C.

These tests are normally carried out in the combustion chambers defined in paragraph 6.3. In certain special cases, however, they may be carried out in the equipment for which the burner has been specifically designed. These test methods are not applicable to burners which are part of a burner-heat exchanger combination constituting a heat generator, as in that case it is the whole assembly which is tested.

A monobloc type burner is an assembly of components, which allows the supply and atomization of the fuel, flame supervision and adjustment of operation to take place. These component parts are either fitted together and mounted on the same equipment, or are supplied together in the same casing. These elements comprise, for example, a fuel pump, an atomizing device, a combustion air fan, an ignition device, a flame supervision device, a burner motor, an oil preheating device.

The assembly is accordingly listed by the manufacturer.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 225:1987, *Atomizing oil burners — Pumps with rotating shaft and external drive; dimensions (and EN 225:1987/AC 1:1987)*.

EN 226:1987, *Atomizing oil burners — Connecting dimensions between burners and heat generators (and EN 225:1987/AC 1:1987)*.

EN 230:1990, *Monobloc oil burners — Safety, control and regulation devices and safety times (and EN 230:1990/AC 1:1991)*.

EN 264:1991, *Safety shut-off devices for combustion plants using liquid fuels — safety requirements and testing*.

3 Classification

Atomizing oil burners are classified according to:

- type of atomization,
- method of control,
- means of ignition.

3.1 Types of atomization

The following different types of atomization are noted:

3.1.1 *Mechanical atomization by pressurization of the combustion liquid*

Atomization of the fuel by means of an atomizing nozzle, through pressure release.

3.1.2 *Atomization by auxiliary fluid*

Atomization is obtained by the fuel flow meeting a flow of air, steam or any other liquid. These types of burner include particularly:

- emulsion burners, in which there is a prior mixing of the fuel with the atomizing fluid,
- rotary cup burners in which atomization is obtained by the fuel, when leaving the edge of a rotating cup, meets a flow of air, steam or any other fluid.

Burners having other means of preparation are allowed, if they comply in all respects with the requirements and test conditions of the European Standard.

3.2 Methods of control of atomizing oil burners

Automatic or semi-automatic burners may be controlled as follows:

3.2.1 *“On-off control”*

Type of control where the burner is either in operation at constant through-put or switched off.

3.2.2 *“Multi-stage control”*

Type of control where several firing stages may be utilized. Burners with only two firing rates are in this category.

3.2.3 *“Modulating control”*

Type of control where the throughput may be infinitely varied between the lower and upper limits.

3.3 Means of ignition

3.3.1 *Automatic electric ignition*

System in which the ignition of the fuel is brought about by means of electrical energy.

3.3.1.1 *Ignition by controlled spark*

System which allows the fuel to be released only when the presence of the ignition spark has been proven.

3.3.1.2 Ignition by non-controlled spark

System in which fuel may also be released when the ignition spark is not controlled.

3.3.2 Automatic ignition with liquid or gaseous fuels

System in which the fuel is ignited by an ignition burner using liquid or gaseous fuels. The operation of these ignition burners may be either permanent or intermittent.

Permanent ignition burners may be operated manually.

Intermittent ignition burners are operated automatically.

3.3.2.1 Ignition by controlled ignition burner

System in which the main fuel supply may only be released when the controlled flame of the ignition burner has been proven.

3.3.2.2 Ignition by non-controlled ignition burner

System in which the main fuel supply may also be released when the ignition burner flame is not controlled.

4 Definitions**4.1 Atomizing oil burners****4.1.1****fully automatic oil burner**

an oil burner equipped with automatic ignition, flame supervision, control and regulating devices. Ignition, flame supervision as well as on-off control of the burner is achieved without the intervention of operating personnel

4.1.2**semi-automatic oil burner**

an oil burner where the main characteristics are those of an automatic oil burner, but where the start-up of the burner is effected by the operating personnel and where after switching off of the burner, there is no automatic restart

4.2 Fuel throughput and performance**4.2.1 Throughput**

Constant mass of fuel m in kg consumed during one hour.

Unit: kg/h.

4.2.1.1**maximum throughput**

mass of fuel m in kg consumed during one hour at the highest throughput stated by the manufacturer

4.2.1.2**minimum throughput**

mass of fuel m in kg consumed during one hour at the lowest throughput stated by the manufacturer

4.2.2 heat input Q_F

Amount of heat as a function of time released by the burner at a given throughput (hourly flow rate $\times$ lower calorific value of the fuel).

Unit: Watt (W):

4.2.2.1**maximum heat input Q_{Fmax}**

maximum heat input of the burner as indicated by the manufacturer

4.2.2.2**heat input Q_{Fmin}**

minimum heat input of the burner as indicated by the manufacturer

4.3 Combustion chamber, test flame tubes**4.3.1****pressure in the combustion chamber P_F**

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

unit: millibar (mbar)

4.3.2**depth l_1 of test flame tube**

distance between the face of the nozzle or the fuel outlet and the sliding rear wall of the test flame tube (see 6.3)

4.4 Composition of the gaseous combustion products**4.4.1****CO₂ content**

quantity of carbon dioxide (CO₂) in the dry gaseous products expressed as a proportion of the total volume, in %

4.4.2**O₂ content**

quantity of oxygen (O₂) contained in the dry gaseous products, expressed as a proportion of the total volume, in %

4.4.3**CO content**

quantity of carbon monoxide (CO) in the dry gaseous combustion products, measured in ppm

4.4.4**content of nitrous oxide**

quantity of nitrous oxide (NO and NO_x) in the dry gaseous combustion products, measured in ppm, calculated in NO₂