
INTERNATIONAL STANDARD



3544

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Atomizing oil burners of the monobloc type — Safety times and safety, control and monitoring devices

Brûleurs à combustibles liquides à pulvérisation de type monobloc — Temps de sécurité et dispositifs de sécurité, de commande et de régulation

First edition — 1978-02-01

UDC 662.941.5

Ref. No. ISO 3544-1978 (E)

Descriptors : oil burners, atomizing burners, safety devices, inspection devices, control devices, ignition systems, operating requirements, definitions.



Documents

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FOREWORD

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 3544 was developed by Technical Committee ISO/TC 109, *Oil burners and associated equipment*, and was circulated to the member bodies in March 1977.

It has been approved by the member bodies of the following countries :

Canada	Korea, Rep. of	Switzerland
Chile	Mexico	Turkey
Egypt, Arab Rep. of	Poland	United Kingdom
France	South Africa, Rep. of	U.S.S.R.
Germany	Sweden	Yugoslavia

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Australia
Belgium

Atomizing oil burners of the monobloc type — Safety times and safety, control and monitoring devices

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the safety times and the functions of safety, control and monitoring devices for automatically and semi-automatically operated atomizing oil burners of the monobloc type.

These burners may use liquid fuels the viscosity of which does not exceed $380 \text{ mm}^2/\text{s}^*$ at 50°C .

This International Standard also applies to combined type burners using alternatively liquid or gas fuels when they operate with liquid fuels.

2 DEFINITIONS

2.1 Atomizing oil burners

atomizing oil burner : A burner for liquid fuel, in which ignition of the fuel is preceded by a preparatory phase in which division of the fuel into small droplets occurs, in order to facilitate mixing with combustion air.

2.1.1 automatic oil burner : An oil burner equipped with automatic flame monitoring, control and regulating devices, so that the ignition of the flame, the flame monitoring as well as the start and the shut-off of the oil burner and possibly the regulation of the amounts of the fuel and the combustion air take place without intervention of operating personnel.

2.1.2 semi-automatic oil burner : An oil burner equipped with automatic ignition, flame monitoring, control and regulating devices, and, possibly, automatic devices for regulating the amounts of fuel and combustion air, on which each ignition for putting the burner into service is carried out manually.

The oil burner is monitored and switched off by flame detectors (and, when available, from limiting devices) during starting and during operation. The burner output (oil throughput) may be automatically or manually regulated during operation.

The switching of the burner may be achieved manually; in this case, the re-ignition, which constitutes a new start, is manual.

2.1.3 monobloc type oil burner : An assembly of components including at least the means for the air and the fuel supply and atomization, the flame monitoring, and the adjustment of operation. The components of the assembly are fixed one to another or assembled on the same frame or in the same housing. These components include at least a fuel pump, an atomizing device, a combustion air fan, an ignition device, a flame monitoring device and a motor. The assembly is catalogued in this way by the manufacturer.

2.2 Regulating, monitoring and control devices

Burners include some or all of the following devices :

2.2.1 regulating device : A device which maintains the controlled quantity (for instance temperature, pressure) at a particular determined value.

2.2.2 flame detector : A device which sends signals to the control device indicating that the flame has failed to be established, is present or has been extinguished.

Such a device generally consists of a sensor (possibly associated with an amplifier) and delivers a signal.

2.2.3 control device; controller : A device which effects starting up and switching off of the oil burner in accordance with a pre-set programme in response to signals from the regulating, monitoring or limiting devices. Some components of the flame detector may be incorporated into the control device (for instance an amplifier with a relay).

2.2.4 limiter : A device which senses the controlled quantity, causing the switching off of the burner. It operates once a predetermined limiting value has been reached.

2.2.4.1 automatically reset limiter : A limiter which resets itself automatically and allows the re-starting of the burner only after a predetermined change of the supervised quantity has occurred.

2.2.4.2 manually reset limiter : A limiter which requires simple manual intervention for the re-starting of the burner.

* $1 \text{ mm}^2/\text{s} = 1 \text{ cSt}$

2.2.4.3 reset limiter with locking device : A limiter which can only be reset by use of specialized tools, by trained personnel, to allow the re-starting of the burner.

2.3 Burner ignition systems

2.3.1 automatic ignition performed electrically : A system in which the ignition necessarily involves the sole use of electrical energy. The two following systems are distinguished :

2.3.1.1 proven spark ignition : A system which admits no fuel flow unless the presence of the spark is proved.

2.3.1.2 unproven spark ignition : A system in which the admission of the fuel is not prevented by the absence of the spark.

2.3.2 automatic ignition provided by liquid or gaseous fuels : A system in which the fuel is ignited by a small liquid or gaseous fuel burner known as a pilot burner and which may be operated continuously or discontinuously. In this latter case the two following systems may be distinguished :

2.3.2.1 ignition by proved pilot burner : A system which admits no main fuel flow unless the presence of flame on the pilot burner is proved.

2.3.2.2 ignition by unproved pilot burner : A system in which the admission of the main fuel is not prevented by the absence of a flame on the pilot burner.

2.4 Conditions of burner shut-down

2.4.1 operating shut-down : A process initiated by a regulating device, by an automatically reset limiter or by a time-switch when fitted.

2.4.2 flame fault shut-down : A process initiated by the action of the flame detector when the flame fails to be ignited or is extinguished, and resulting in a lock-out of the control device under the conditions of clause 4.

2.4.3 safety shut-down : A lock-out of the control device after a response is received from either a manually reset limiter or a reset limiter with locking device (for example for pressure, temperature, water-level, atomizing medium, or combustion air).

2.4.4 lock-out : Stopping of the control device so that re-starting cannot be effected without manual intervention.

2.4.5 re-ignition : A process in which the ignition is switched on after extinction of the flame during operation, without the oil supply being interrupted.

2.4.6 re-start; repetition : A process in which the starting procedure is repeated after extinction of the flame during operation. When re-starting is carried out, the specified control programme sequence must be adhered to.

2.5 Safety and functioning times (see diagram in annex)

2.5.1 total ignition time : The period during which the ignition device is in operation. Pre-ignition, actual ignition and post-ignition times comprise the total ignition time.

2.5.1.1 pre-ignition time : The period between the starting-up of the ignition device and the release of the oil supply.

2.5.1.2 actual ignition time : The period between the release of the oil supply and the first appearance of the flame.

2.5.1.3 post-ignition time : The period between the first appearance of the flame and the switching off of the ignition device.

2.5.2 safety time : The maximum permitted period of time during which the control device allows release of the oil when no flame is present.

A distinction is made between the safety times, according to whether they are followed by fault shut-downs when starting-up or during operation.

2.5.2.1 safety time at ignition : The period beginning the instant the signal to release the oil supply is given and finishing with the signal to shut off the oil supply.

2.5.2.2 safety time during the state of operation : The period beginning at the instant of the disappearance of the flame and finishing with the signal to shut off the oil supply.

2.5.3 flame simulation : A signal indicating that a flame is present whereas in fact no flame is present.

NOTE — For protection against the simulation of a flame and against stray light (applicable only in the case of flame detection systems relating to a continuous level of illumination), see 4.2.

2.5.4 purging time : The period during which the combustion chamber is forcibly ventilated as indicated in 3.4, without the oil supply being released.

2.5.4.1 pre-purging time : The period immediately preceding the release of the fuel supply.

2.5.4.2 post-purging time : The period immediately subsequent to the cutting off of the fuel supply.

2.5.5 state of operation : The state beginning when the flame is in existence after the permitted safety time necessary for the ignition; at this point the starting-up process ends. Starting-up may be considered not to have taken place if the release of the fuel is not authorized or if it is interrupted on expiry of the safety time by lock-out of the control device.