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Lighters — Safety specification

Briquets — Spécifications de sécurité

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 9994 was prepared by Technical Committee ISO/TC 61, *Plastics*.

This third edition cancels and replaces the second edition (ISO 9994:1995). Other than editorial changes made for purposes of clarification, and changes in format now required by ISO, there are a number of technical changes as follows.

a) The maximum flame height for adjustable postmixing burner gas lighters has been reduced.

b) Requirements for premixing burner gas lighters have been added to the standard. This type of lighter is sometimes referred to as a “catalytic” lighter.

c) In the elevated-temperature test, the temperature has been increased and the controlled water bath has been deleted.

d) The direction for flame height adjustment is now required to be permanently imprinted or engraved on the lighter.

e) In the fuel compatibility test and the elevated-temperature test, a lighter empty of fuel is considered a failure.

This International Standard reproduces the technical content of ASTM/ANSI F 400-97.

Annex A of this International Standard is for information only.

Lighters — Safety specification

1 Scope

This International Standard establishes requirements for lighters to ensure a reasonable degree of safety for normal use or reasonably foreseeable misuse of such lighters by users.

The safety specification given in this International Standard applies to all flame-producing products commonly known as cigarette lighters, cigar lighters and pipe lighters. It does not apply to matches, nor does it apply to other flame-producing products intended solely for igniting materials other than cigarettes, cigars, and pipes.

Lighters, being flame-producing devices, can, as do all flame sources, present a potential hazard to users. The safety specification given in this International Standard cannot eliminate all hazards, but is intended to reduce potential hazards to users.

2 Terms and definitions

For the purposes of this International Standard, the following terms and definitions apply.

2.1
lighter
manually operated flame-producing device, employing a petrochemical derivative as a fuel, normally used for deliberately igniting cigarettes, cigars and pipes, and which may foreseeably be used to ignite materials such as paper, wicks, candles and lanterns

NOTE Lighters are specifically not intended for use as candles or as flashlights, or for other uses requiring an extended burn time.

2.2
fluid lighter
lighter, with an exposed wick, that employs as fuel liquid hydrocarbons such as hexane whose gauge vapour pressure at 24 °C does not exceed 34,5 kPa

2.3
gas lighter
lighter that employs as fuel liquefied hydrocarbons such as *n*-butane, isobutane and propane whose gauge vapour pressure at 24 °C exceeds 104 kPa

2.4
postmixing burner lighter
gas lighter in which fuel is supplied for combustion and air is supplied at the point of combustion

2.5
premixing burner lighter
gas lighter in which fuel and air are mixed before being supplied for combustion

2.6
disposable lighter
lighter marketed with an integral supply of fuel and that is not intended to be refuelled

2.7
refillable lighter
lighter intended to be refuelled either by transferring fuel from an external container or by inserting a new prefilled fuel reservoir

2.8
adjustable lighter
lighter provided with a mechanism for the user to vary the flame height

2.9
non-adjustable lighter
lighter that is not provided with a user-accessible mechanism to adjust the flame height

NOTE The flame height is preset by the manufacturer.

2.10
automatically adjusting pipe lighter
lighter characterized by an automatic increase in flame height when tilted from an upright position, designed specifically for the purpose of lighting pipes

2.11
self-extinguishing lighter
lighter that, once ignited, requires continuous intentional and positive action to maintain a flame and that is subsequently extinguished by the termination of such positive action

2.12
non-self-extinguishing lighter
lighter that, once ignited, does not require intentional or positive action by the user to maintain a flame and requires a subsequent deliberate user action to extinguish the flame

2.13
flame height
linear distance from the tip of the visible flame to the top of the shield or, in the absence of a shield, from the tip of the visible flame to the bottom of the wick or burner valve orifice

2.14
shield
structure that totally or partially surrounds the burner valve orifice of a gas lighter or the wick of a fluid lighter

2.15
burner valve
component of a gas lighter which controls the release of fuel

2.16
burner valve orifice
tip of the burner valve from which fuel is released

2.17
flaring
variation of flame height from the steady-state flame condition

2.18
sustained self-ignition
propagation of a flame by other than deliberate manual operation, such as by dropping the lighter, so as to cause the ignition element to be activated and the flame to continue to burn

2.19
spitting
sputtering
flame phenomenon of a gas lighter wherein the escape of non-evaporated liquefied gas produces a shower of burning liquid droplets which separate from the main flame

2.20
flame
result of combustion of fuel that produces heat and often light which could be visible with the naked eye under normal or subdued lighting conditions

2.21
ignite
produce a flame with a lighter by activating the self-contained ignition and fuel release systems of that lighter in the intended manner

3 Functional requirements

3.1 Flame generation

In order to minimize the possibility of inadvertent ignition, or self-ignition, lighters shall require a deliberate manual operation to produce a flame. This operation shall conform to at least one of the following requirements:

a) positive action on the part of the user shall be required to generate and maintain a flame;

b) two or more independent actions by the user shall be required to generate a flame;

c) an actuating force equal to, or greater than, 15 N shall be required to generate a flame (see Figure 1 or Figure 2).

3.2 Flame heights

NOTE Maximum flame heights specified in this International Standard, for both postmixing burner lighters and premixing burner lighters, will be reconsidered periodically with a view to gradual reduction in line with technological progress.

3.2.1 Non-adjustable lighters

3.2.1.1 Non-adjustable fluid lighters shall not be capable of producing a flame height greater than 120 mm when tested in accordance with 5.2.

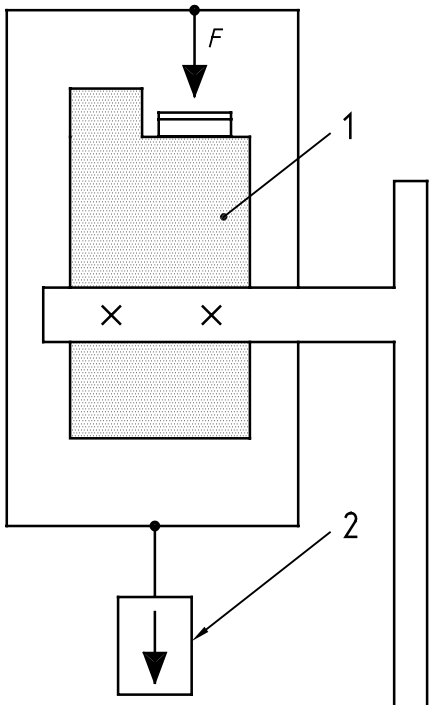
3.2.1.2 Non-adjustable, postmixing and premixing burner lighters shall not be capable of producing a flame height greater than 50 mm when tested in accordance with 5.2.

3.2.2 Adjustable lighters

3.2.2.1 For adjustable lighters as defined in 2.8, the maximum flame height that a user will obtain under different conditions of use shall comply with the following requirements when tested in accordance with 5.2.

3.2.2.2 Adjustable postmixing burner lighters shall have the flame height adjusted by the manufacturer in such a manner that the lighter, when first ignited by the user — without changing the adjustment — will not produce a flame height greater than 100 mm.

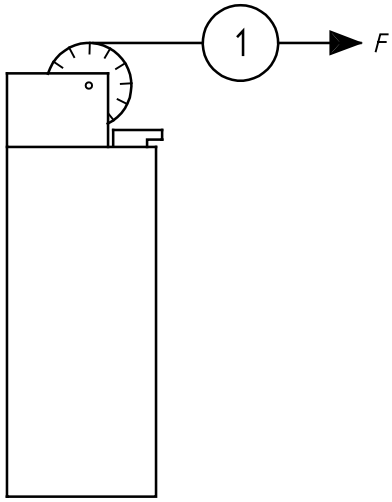
3.2.2.3 Adjustable postmixing burner lighters shall not be capable of producing a flame height greater than 120 mm when deliberately adjusted by the user to the manufacturer's design limit for maximum flame height.



Key

1 Lighter
2 Mass
F Flame-generation actuating force

Figure 1 — Application of flame-generation actuating force as specified in 3.1 c) — Push-button actuator



Key

1 Force gauge
F Flame-generation actuating force

Figure 2 — Application of flame-generation actuating force as specified in 3.1 c) — Rotary actuator

3.2.2.4 Adjustable premixing burner lighters shall have the flame height adjusted by the manufacturer in such a manner that the lighter, when first ignited by the user — without changing the adjustment — will not produce a flame height greater then 60 mm.

3.2.2.5 Adjustable premixing burner lighters shall not be capable of producing a flame height greater than 75 mm when deliberately adjusted by the user to the manufacturer's design limit for maximum flame height.

3.2.2.6 Adjustable postmixing and premixing burner lighters shall not be capable of producing a flame height greater than 50 mm when set at the lowest possible flame height.

3.2.2.7 Automatically adjusting pipe lighters shall not be capable, in any position, of producing a flame height greater than 100 mm.

3.2.2.8 The maximum attainable flame height for lighters shall be limited by pre-setting or by product design, or both.

NOTE See also annex A on AQLs and the Bibliography for sampling scheme references.

3.3 Flame-height adjustment

3.3.1 Adjustable lighters as defined in 2.8 shall require a deliberate action on the part of the user either to decrease or to increase the flame height when used in the normal manner. Adjustable lighters shall bear an indication showing the direction of movement of the adjusting mechanism required to produce a higher or lower flame.

3.3.2 On lighters whose adjusting mechanisms conform to 3.3.3 and 3.3.4, the direction of movement shall be permanently imprinted or engraved on the lighter.

3.3.3 Gas lighters having rotary-movement flame-control actuators approximately at right-angles to the flame shall perform as follows:

a) when the flame-control actuator is at the top of the lighter and the lighter is held so that the flame is oriented vertically upward, and the user is facing the flame-control actuator, moving the actuator to the left shall produce a decrease in flame height;

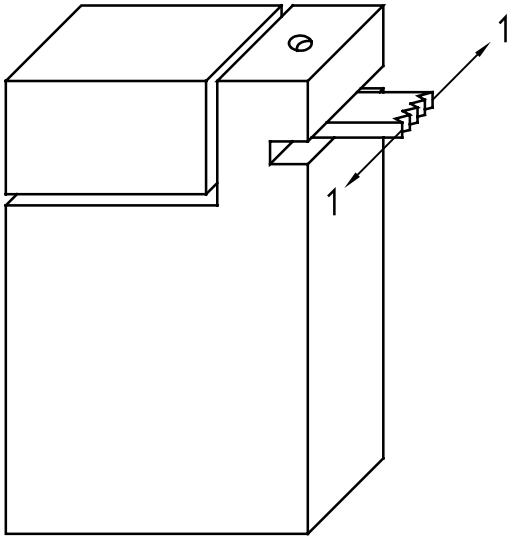
b) when the flame-control actuator is at the bottom of the lighter, and the lighter is held so that the user is facing the actuator, a clockwise movement shall produce a decrease in flame height.

3.3.4 For gas lighters requiring movement of the flame-control actuator approximately parallel to the flame axis, the flame height shall decrease or increase in accordance with the direction of the movement.

3.3.5 If the flame-control actuator protrudes from the body of the lighter, it shall require a minimum actuating force of 1 N applied over the entire range of adjustment in a tangential direction (see Figure 3).

3.4 Resistance to spitting or sputtering and flaring

Gas lighters as defined in 2.3, when set at the maximum flame height, shall exhibit no spitting or sputtering as defined in 2.19, or flaring as defined in 2.17, when tested in accordance with 5.3.



Key

1 Direction of flame-control actuating force

Figure 3 — Application of flame-control actuating force as specified in 3.3.5

3.5 Flame extinction

When a lighter is extinguished in the intended manner, for example by closing a cover or by releasing a button or a lever, it shall meet the following requirements with respect to extinction time.

a) Non-adjustable fluid and postmixing burner lighters, at their permanently set flame heights, when tested in accordance with 5.4, shall have any exposed flame completely extinguished within 2 s after a 10 s burn.

b) Adjustable postmixing burner lighters, when tested in accordance with 5.4, shall have any flame completely extinguished within 2 s

   1) after a 10 s burn when set at a flame height of 50 mm, or the maximum flame height the adjustment allows if lower than 50 mm;

   2) after a 5 s burn when set at maximum flame height.

c) In the case of postmixing burner lighters that have shields, an additional 2 s afterburn (i.e. continuous burning) is acceptable if the flame, during this additional 2 s period, does not extend above the shield.

d) Non-adjustable premixing burner lighters, at their permanently set flame heights, when tested in accordance with 5.4, shall have any flame completely extinguished in no more than 5 s.

e) Adjustable premixing burner lighters, when tested in accordance with 5.4, shall have any flame completely extinguished in no more than 5 s

   1) after a 10 s burn when set at a flame height of 50 mm, or the maximum flame height the adjustment allows if lower than 50 mm;

   2) after a 5 s burn when set at maximum flame height.

NOTE In the case of premixing burner gas lighters, the total afterburn time in this International Standard will be reconsidered periodically with a view to gradual reduction in line with technological progress.

3.6 Volumetric displacement

For gas lighters shipped with fuel, the liquid portion of the fuel shall not exceed 85 % of the volumetric capacity of the fuel reservoir when tested in accordance with 5.7.

4 Structural integrity requirements

4.1 External finish

Lighters shall have no external sharp edges that could cause accidental cuts or abrasions to the user when handled or used in the intended manner.

4.2 Compatibility with fuel

4.2.1 Components of fluid lighters as defined in 2.2 that come into contact with the fuel recommended by the manufacturer shall not, after extended contact with that fuel, deteriorate so as to cause the lighter to fail any of the criteria contained in this specification, when tested in accordance with 5.5.

4.2.2 Components of gas lighters as defined in 2.3 that come into contact with the fuel recommended by the manufacturer shall not deteriorate after exposure to the fuel, so as to cause the lighter to fail any of the criteria contained in this specification or allow gas escape exceeding 15 mg/min, when tested in accordance with 5.5.

4.3 Resistance to fuel loss

4.3.1 Refillable fluid lighters having a sealed fuel reservoir shall have a sealing closure which shall prevent loss or leakage of fuel from both the sealed reservoir and the sealing closure when such sealing closure is installed in the lighter by the user in the intended manner, when tested in accordance with 5.6.

4.3.2 Refillable gas lighters shall have a pressurized fuel reservoir whose refilling valve shall be secure enough to prevent an escape of gas exceeding 15 mg/min, when tested in accordance with 5.6.

4.4 Resistance to dropping

4.4.1 Without impairing their subsequent safe operation, lighters shall be capable of withstanding three separate (1,5 ± 0,1) m drops conducted in accordance with 5.8:

a) without fuel reservoir rupture/fragmentation

and

b) without sustained self-ignition as defined in 2.18.

In addition, for gas lighters, gas escape shall not exceed 15 mg/min.

4.4.2 Lighters that meet these requirements and that are able to be ignited in the intended manner shall subsequently meet all the requirements of clause 3. Lighters that are not able to be ignited in the intended manner do not constitute a failure.

In the event of a shield becoming detached during the drop test, it can be re-attached, if this is practicable, and the test continued.

4.5 Resistance to elevated temperature

4.5.1 Gas lighters, and fluid lighters with a sealed compartment filled with non-absorbed fuel, shall be capable of withstanding a temperature of 65 °C for 4 h when tested in accordance with 5.9.