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Oxygen/fuel gas blowpipes (cutting machine type) with cylindrical barrels — General specifications and test methods

*Chalumeaux oxy-gaz combustible (type machine d'oxycoupage) à corps
cylindrique — Spécifications générales et méthodes d'essai*



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Foreword

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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.

International Standard ISO 5186 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 8, *Equipment for gas welding, cutting and allied processes*.

Annexes A and B of this International Standard are for information only.

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International Organization for Standardization

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Oxygen/fuel gas blowpipes (cutting machine type) with cylindrical barrels — General specifications and test methods

1 Scope

This International Standard specifies the characteristics of machine cutting blowpipes and gives specifications and corresponding tests.

This International Standard applies to machine cutting blowpipes which are fitted to a gas cutting machine and which have cylindrical barrels where the nozzle centre is coaxial with the barrel, the blowpipe operates with oxygen and fuel gas and has a cutting range from 3 mm to 300 mm cutting thickness.

NOTE 1 In addition to terms used in two official ISO languages (English and French), this International Standard gives the equivalent terms (and definitions) in the German language; these are published under the responsibility of the member body for Germany (DIN). However, only the terms given in the official languages can be considered as ISO terms.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3:1973, *Preferred numbers — Series of preferred numbers*.

ISO 3253:1975, *Hose connections for equipment for welding, cutting and related processes*.

ISO 5175:1987, *Equipment used in gas welding, cutting and allied processes — Safety devices for fuel gases and oxygen or compressed air — General specifications, requirements and tests*.

ISO 9090:1989, *Gas tightness of equipment for gas welding and allied processes*.

ISO 9539:1988, *Materials for equipment used in gas welding, cutting and allied processes*.

3 Definitions

Terminology concerning machine cutting blowpipes is given in annex B. The design details of the blowpipes are left to the discretion of the manufacturer; the illustrations in this International Standard are solely to clarify the terms.

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

3.1 Common types of mixing systems

3.1.1 injector-mixer: Mixing system in which the fuel gas and the oxidizing gas are mixed by the action of the latter which, being discharged from the orifice of the injector, reduces the pressure, thus entraining the fuel gas.

Accordingly, when the valve in the fuel gas channel is closed while the oxidizing gas is normally discharged, the pressure in this channel is below atmospheric pressure. If, at the same time, the fuel gas hose connecting nipple is exposed to the atmosphere, air will be entrained (fuel gas valve open — see figure 1).

3.1.2 mixer without injector action: Mixing system in which the fuel gas and the oxidizing gas are mixed when the latter is discharged from the orifice and meets the fuel gas which is discharged at nearly identical pressure. When the valve in the fuel gas channel is closed while the oxidizing gas is discharged, the pressure in this channel is higher than the atmospheric pressure. If, at the same time, the fuel gas hose connecting nipple is exposed to the atmosphere, oxidizing gas will be discharged (fuel gas valve open — see figure 2).

NOTE 2 Position of the mixing systems:
The mixing systems according to 3.1.1 and 3.1.2 are usually in the blowpipe or in the nozzle.

3.2 High-pressure and low-pressure blowpipes

3.2.1 high-pressure blowpipe: A blowpipe in which the pressure of both the fuel gas and the oxidizing gas measured immediately before the point of mixing is higher than the pressure of the gas mixture measured downstream between mixer and nozzle (see figure 2).

3.2.2 low-pressure blowpipe: A blowpipe in which the fuel gas pressure measured immediately before the point of mixing is lower than the pressure of the gas mixture measured downstream between mixer and nozzle (see figure 1).

3.3 Blowpipes classified according to the possibility of varying the flow rate

3.3.1 blowpipe with multiple flow rates: A blowpipe giving a range of flow rates corresponding to a series of nozzles.

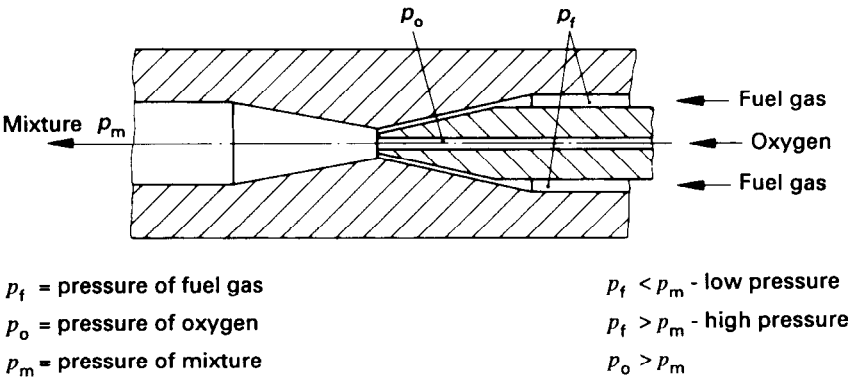


Figure 1 — Injector mixer (low and high pressure)

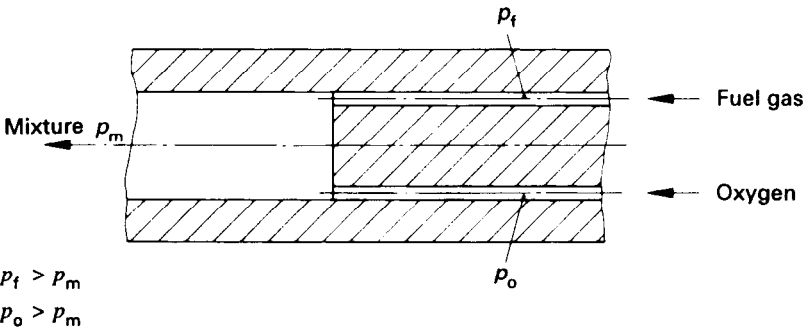


Figure 2 — Mixer without injector action

3.3.1.1 blowpipe with multiple gas flow rates adjusted by means of the injector: A blowpipe with multiple gas flow rates which are varied by means of a device for adjustment of the injector cross-section (blowpipe with variable injector).

3.3.1.2 blowpipe with multiple gas flow rates adjusted by the pressure: A blowpipe with multiple gas flow rates which are varied by adjusting the feed pressures (blowpipe with fixed mixer).

3.3.1.3 blowpipe with multiple gas flow rates adjusted by means of gas control valves: A blowpipe with multiple gas flow rates which are varied by means of the adjustment valves.

3.4 Blowpipes classified according to the mixing position

3.4.1 blowpipe with preliminary mixer: A blowpipe in which the mixture of heating oxygen and fuel gas is ensured by the injector-mixer located before the cutting nozzle.

3.4.2 blowpipe with nozzle mixing: A blowpipe in which the heating oxygen and fuel gas ways are independent in the blowpipe and the head. The gases are mixed in the cutting nozzle (nozzle mixing).

3.5 Backfire, sustained backfire, flashback, backflow

3.5.1 backfire: The return of the flame into the blowpipe with a popping sound, the flame being either extinguished or reignited at the nozzle.

3.5.2 sustained backfire: The return of the flame into the blowpipe with continued burning within the neck or mixer. (This may be accompanied by an initial popping sound followed by a continuous hissing sound caused by continued burning within the blowpipe.)

3.5.3 flashback: The return of the flame through the blowpipe into the hoses and even the regulators. It may also reach the acetylene cylinder, causing heating and decomposition of the contents.

3.5.4 backflow: Flowing back of the gas at the higher pressure into the hose of the gas at the lower pressure. This can be caused by the nozzle exit becoming blocked or restricted.

4 Dimensions

4.1 Shank diameter

The diameter of the blowpipe cylinder shank (D) is preferably equal to one of the following values:

- 32 mm, 35 mm = usual diameters;
- 28 mm = useful diameter for portable machines and robot equipment;
- 45 mm = used e.g. for automatic internal ignition systems.

Tolerance on shank diameter $\begin{smallmatrix} 0 \\ -0,2 \end{smallmatrix}$ mm.

4.2 Shank length

The shank length (L) is the length on which the blowpipe holder can be fixed.

The shank length will be preferably equal to 50 mm, 100 mm, 160 mm, 250 mm and 400 mm.

If other lengths are to be used, they should comply with the series R 20 (ISO 3).

4.3 Rack

The rack is not mandatory, unless required by the blowpipe fixing and height adjusting device.

If a rack is fitted it shall comply either with type F, S, J or N given in table 1.

A spur tooth rack is characterized by its width, the module and pitch of its teeth and its position on the cylinder shank (dimension E on figure 3).

5 Hose connections

The nipples shall either be permanently fitted to the shank or be detachable. The external profile of the nipples is left to the choice of manufacturer. Where a threaded union connection is used it shall conform to ISO 3253.

6 Material

The material requirements, according to ISO 9539, shall be fulfilled.

Components in contact with oxygen shall be free from oil, grease and other contaminants.

Table 1 — Dimensions of the rack

Spur tooth rack	Type F	Type S	Type N	Type J
Module	1	1,25	0,794	1
Pitch, mm	3,14	3,927	2,49	3,14
Width <i>B</i> , mm	$8 \begin{smallmatrix} 0 \\ -0,2 \end{smallmatrix}$	$8 \begin{smallmatrix} 0 \\ -0,2 \end{smallmatrix}$	$6,22 \begin{smallmatrix} 0 \\ -0,13 \end{smallmatrix}$	$6 \begin{smallmatrix} 0 \\ -0,2 \end{smallmatrix}$
Dimension <i>E</i> , mm	$D + 7 \begin{smallmatrix} 0 \\ -0,3 \end{smallmatrix}$	$D + 7 \begin{smallmatrix} 0 \\ -0,3 \end{smallmatrix}$	$D + 6,35 \begin{smallmatrix} 0 \\ -0,3 \end{smallmatrix}$	$D + 6 \begin{smallmatrix} 0 \\ -0,3 \end{smallmatrix}$

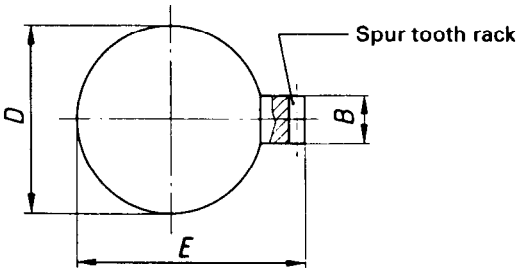


Figure 3 — Main specifications

7 Marking

The marking shall be legible and durable.

7.1 Marking of the blowpipe

The blowpipe shank shall carry the name or registered trade mark of the manufacturer (the term “manufacturer” includes distributors, suppliers or importers) and the reference number of this International Standard. The marking shall be according to 7.5 and 7.6. The connection adjacent to the oxygen inlet of blowpipes with fixed hose connecting nipples shall be identified by the letter “O”.

7.2 Marking of oxygen valves

The heating oxygen valves (body or knob) shall be identified by the letter “O” and/or the colour blue.

The cutting oxygen valve shall be identified if similarly designed.

7.3 Marking of nozzles

All nozzles shall be marked with the name, registered trade mark or identifying mark of the manufacturer, the symbol identifying the fuel gas and a code to al-

low easy reference to the manufacturer's operating data.

7.4 Marking of interchangeable components

Where mismatching of interchangeable components (e.g. mixer and injector) could occur, an identifying code, the manufacturer's trade mark and the symbol identifying the fuel gas shall be marked and shown in the operating data.

7.5 Marking of mixers

The user is advised to refer to the operating instructions provided by the manufacturer (see clause 10). If operating pressures are marked on any part of the blowpipe they shall be indicated in bars.

If the mixing device is symbolically marked, indicating the blowpipe type, the marking should conform to the symbols shown in figures 4 to 6.



Figure 4 — Fuel gas injector mixer