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**Manual blowpipes for welding,
cutting and heating**

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee, as the result of proposal for revision of Japanese Industrial Standard submitted by The Japan Welding Engineering Society (JWES) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14. Consequently **JIS B 6801 : 1991** and **JIS B 6802 : 1991** are replaced with this Standard.

This revision has been made based on **ISO 5172 : 1995** *Manual blowpipes for welding, cutting and heating—Specifications and tests* for the purposes of making it easier to compare this Standard with International Standard; to prepare Japanese Industrial Standard conforming with International Standard; and to propose a draft of an International Standard which is based on Japanese Industrial Standard.

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In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

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Manual blowpipes for welding, cutting and heating

Introduction This Japanese Industrial Standard has been prepared based on the first edition of **ISO 5172** *Manual blowpipes for welding, cutting and heating—Specifications and tests*, published in 1995 by modifying the technical contents. In this revision, specifications from **JIS B 6802** *Manual gas cutting torches* are integrated, and those for manual blowpipes for heating are added.

The portions underlined with dots in this Standard are the matters modified from the International Standard. Annex C (informative) shows a list of modifications with the explanations thereof.

1 Scope This Standard applies to manual blowpipes for welding, cutting and heating (hereafter referred to as “welding blowpipes, cutting blowpipes, and heating blowpipes”) used for welding, cutting and heating metals by mixing oxygen with fuel gas such as acetylene gas, or liquefied petroleum gas (hereafter referred to as “LPG”) of the maximum working flow-rate shown in Table 1 [for fuel gas not described in Table 1, the fuel gas of heat generation of 134 400 kJ/h (32 000 kcal/h) or under shall apply], or gases of the heating effect equivalent thereto.

Table 1 Maximum working flowrate

Fuel gas	Symbol	Maximum working flowrate (l/h)
Acetylene	A	2 500
Propane	P	1 500
Butane		1 200
Natural gas, methane	M	4 000
Hydrogen	H	13 000
Ethylene	E	2 200

Remarks : The International Standard corresponding to this Standard is as follows.

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21**.

ISO 5172 : 1995 *Manual blowpipes for welding, cutting and heating—Specifications and tests* (MOD)

2 Normative references The following standards contain provisions which, through reference in this Standard, constitute provisions of this Standard. If the indication of the year of publication is given to these referred standards, only the edition of the indicated year constitutes the provision of this Standard but the revision and amendment made thereafter do not apply. The normative references without the indication

of the year of coming into effect apply only to the most recent edition (including amendments).

- JIS B 0205-1 *ISO general purpose metric screw threads—Part 1 : Basic profile*
- JIS B 0205-4 *ISO general purpose metric screw threads—Part 4 : Basic dimensions*
- JIS B 0209-2 *ISO general purpose metric screw threads—Tolerances—Part 2 : Limits of sizes for general purpose external and internal screw threads—Medium quality*
- JIS B 0251 *Limit gauges for metric screw threads*
- JIS B 0405 *General tolerances—Part 1 : Tolerances for linear and angular dimensions without individual tolerance indications*
- JIS B 6805 *Rubber hose connection for equipment for welding, cutting and allied processes*
- JIS B 7502 *Micrometer callipers*
- JIS B 7507 *Vernier, dial and digital callipers*
- JIS G 3101 *Rolled steels for general structure*
- JIS G 3459 *Stainless steel pipes*
- JIS G 4303 *Stainless steel bars*
- JIS G 4309 *Stainless steel wires*
- JIS H 3250 *Copper and copper alloy rods and bars*
- JIS H 3300 *Copper and copper alloy seamless pipes and tubes*
- JIS H 5120 *Copper and copper alloy castings*
- JIS H 5302 *Aluminium alloy die castings*
- ISO 9539 : 1988 *Materials for equipment used in gas welding, cutting and allied processes*

3 Definitions The definition of terms used in this Standard shall be as follows:

- a) **fuel gas** Gas used in welding, cutting and heating; namely, acetylene or LPG or flammable gas with the heating effect equivalent thereto.
- b) **blowpipe** Appliance having an inlet part, a nozzle fitting part and a flame adjustment valve for oxygen and fuel gas.
- c) **nozzle** Nozzle to form flame, which, in case of use for cutting, blow cutting oxygen as forming flame.
- d) **connector** Connection part of a cutting blowpipe to a nozzle to perform metal sealing (see Fig. 2).
- e) **welding blowpipe** Blowpipe for welding with a welding nozzle fitted thereto.
- f) **cutting blowpipe** Blowpipe for cutting with a cutting nozzle fitted thereto.

- g) **heating blowpipe** Blowpipe for heating with a heating nozzle fitted thereto.
- h) **duplex blowpipe** Blowpipe used for welding, cutting or heating by changing a part (attachment) of the blowpipe.
- i) **mixer** Part where oxygen is mixed with fuel gas.
- j) **kraan** Appliance with a valve that is integrated and used to open/close oxygen and fuel gas in Type A welding blowpipe.
- k) **nozzle mixing** Gas mixing system to mix oxygen with fuel gas inside a nozzle.
- l) **blowpipe mixing** Gas mixing system to mix oxygen with fuel gas inside a blowpipe.
- m) **type test** Test to check the design quality.
- n) **qualification test** Test to check the manufacture quality.
- o) **test gas** Air or nitrogen without any oil or grease used to carry out tests in accordance with this Standard.
- p) **nominal flow rate** Flow rate specified by manufacturers.
- q) **maximum working pressure** Maximum value of working pressure specified by manufacturers. Maximum value if the pressure range is specified, and if not, pressure of 115 % of the specified pressure.
- r) **minimum working pressure** Minimum value of working pressure specified by manufacturers. Minimum value if the pressure range is specified, and if not, pressure of 85 % of the specified pressure.
- s) **neutral flame, reducing flame, and oxidizing flame** Terms to express the state of flame. Neutral flame is a flame whose white feather-like flame is formed at the tip and contracts and joins with the white brightness within the flame (primary flame inner cones). Reducing flame is a flame in which excessive fuel gas is contained compared with a neutral flame, and which is also referred to as carbonizing flame. Oxidizing flame is a flame in which excessive oxygen is contained compared with a neutral flame.
- t) **standard flame** Neutral flame at nominal flow rate.
- u) **backfire** Phenomenon in which the flame returns into the blowpipe with a popping sound.
- v) **sustained backfire** Phenomenon in which the flame returns into the blowpipe, and continuous combustion occurs inside a mixing chamber.
Information : This may be accompanied by an initial popping sound followed by a continuous hissing sound caused by continued burning within the blowpipe.
- w) **flashback** Phenomenon in which the flame returns through the blowpipe into the hose, or sometimes even the regulator.
- x) **backflow** Phenomenon in which oxygen flows to the fuel gas side, or fuel gas flows to the oxygen side.

- y) **wedge-shaped cutting** Cutting test method to obtain the cutting thickness at the point where the blowpipe is no longer capable of cutting the reached thickness when cutting is performed from the smaller cutting thickness at a certain cutting speed (arbitrary) by using a wedge-shaped cutting piece with the cutting thickness successively increased.

4 Type

4.1 Welding blowpipes The type of welding blowpipes shall be as specified in Table 2.

Table 2 Type of welding blowpipes

Type	SA	A			SB	B				
Grade	—	1	2	3	—	00	0	01	1	2

- Remarks 1 Type SA welding blowpipe is a welding blowpipe employing nozzle mixing, which is combined with a nozzle.
- 2 Type A welding blowpipe is a welding blowpipe employing nozzle mixing, which is combined with a nozzle, while the size thereof is specified [see Fig. 1 a)].
- 3 Type SB welding blowpipe is a welding blowpipe employing blowpipe mixing, which is combined with a nozzle.
- 4 Type B welding blowpipe is a welding blowpipe employing blowpipe mixing, which is combined with a nozzle, while the size thereof is specified [see Fig. 1 b)].

4.2 Cutting blowpipes The type of cutting blowpipes shall be as specified in Table 3.

Table 3 Type of cutting blowpipes

Type	10	1			20	30	3		
Grade		1	2	3	—	—	1	2	3

- Remarks 1 Type 10 cutting blowpipe is a cutting blowpipe in which a connector of a nozzle employing blowpipe mixing combines one blowpipe with the nozzle.
- 2 Type 1 cutting blowpipe is a cutting blowpipe in which a connector employing blowpipe mixing combines one blowpipe with a nozzle, while the size thereof is specified.
- 3 Type 20 cutting blowpipe is a cutting blowpipe in which a connector employing blowpipe mixing combines two blowpipes with a nozzle.
- 4 Type 30 cutting blowpipe is a cutting blowpipe in which a connector employing nozzle mixing combines three blowpipes with a nozzle.

- 5 Type 3 cutting blowpipe is a cutting blowpipe in which a connector employing nozzle mixing combines three blowpipes with a nozzle, while the size thereof is specified.

4.3 Heating blowpipes The type of heating blowpipes shall be as specified in Table 4.

Table 4 Type of heating blowpipes

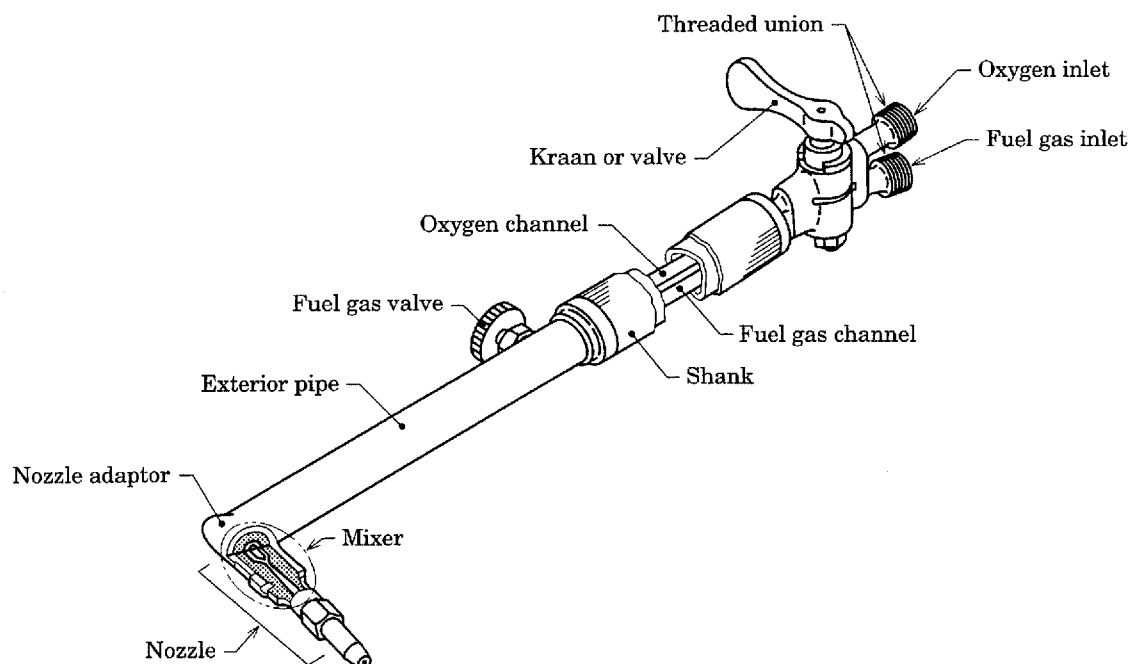
Type	HA	HP	HM	HH	HE
Grade	Maximum working capacity of blowpipe (l/h)				

- Remarks 1 Type HA heating blowpipe is a heating blowpipe in which the service fuel gas is acetylene, Type HP heating blowpipe is a heating blowpipe in which the service fuel gas is LPG, Type HM heating blowpipe is a heating blowpipe in which the service fuel gas is liquefied natural gas or methane, Type HH heating blowpipe is a heating blowpipe in which the service fuel gas is hydrogen, and Type HE heating blowpipe is a heating blowpipe in which the service fuel gas is ethylene, respectively.
- 2 "Grade" is expressed by the blowpipe's maximum working capacity of the fuel gas, in the maximum flow rate (l/h) per unit time.

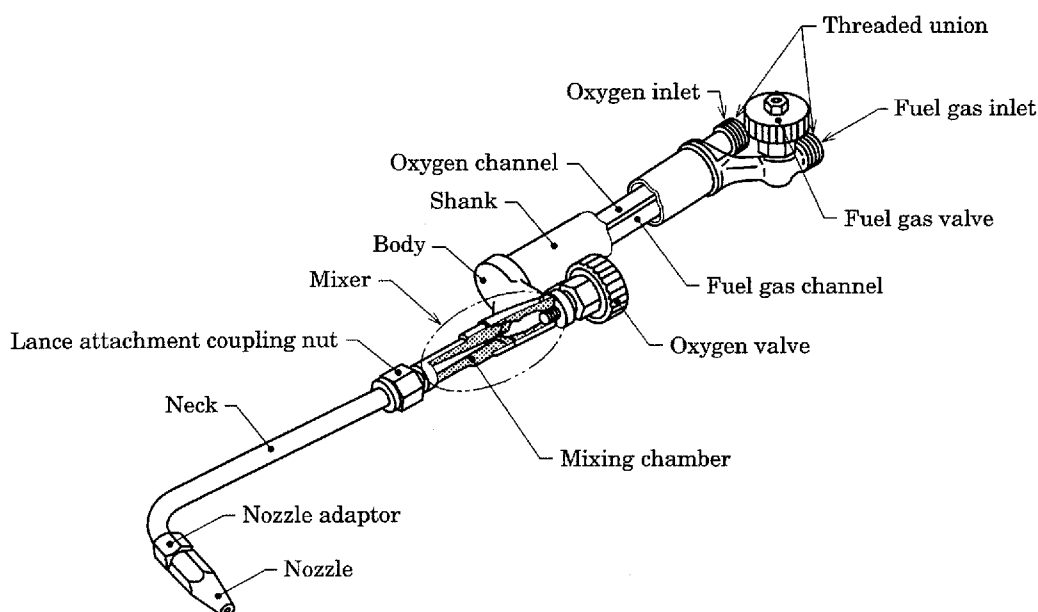
4.4 Duplex blowpipes Duplex blowpipe belongs to a welding blowpipe if a welding attachment is fitted, to a cutting blowpipe if a cutting attachment is fitted, or to a heating blowpipe if a heating attachment is fitted.

5 Name

5.1 Welding blowpipes The names of welding blowpipes shall be as shown in Fig. 1.



a) Type A welding blowpipe

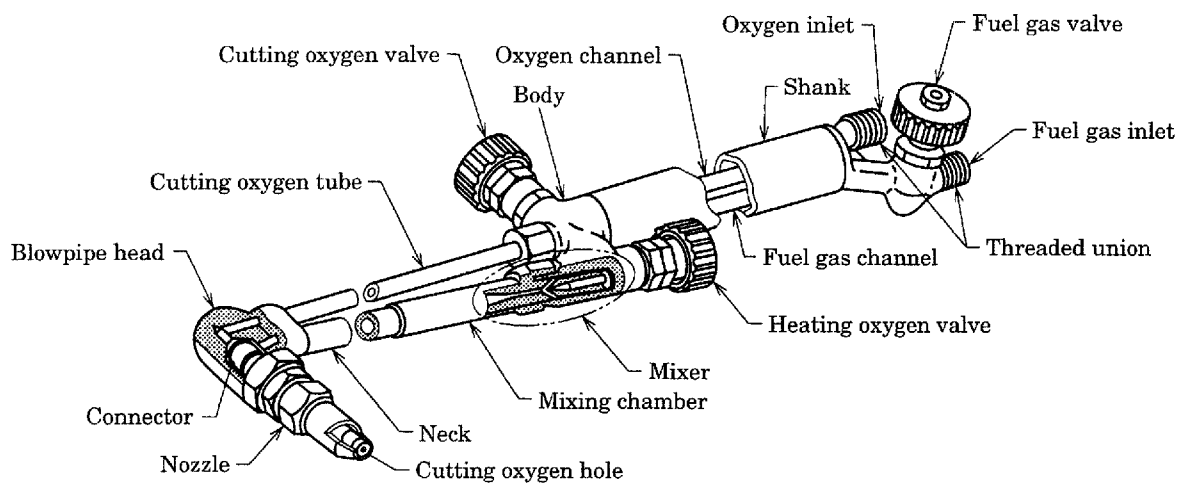


b) Type B welding blowpipe

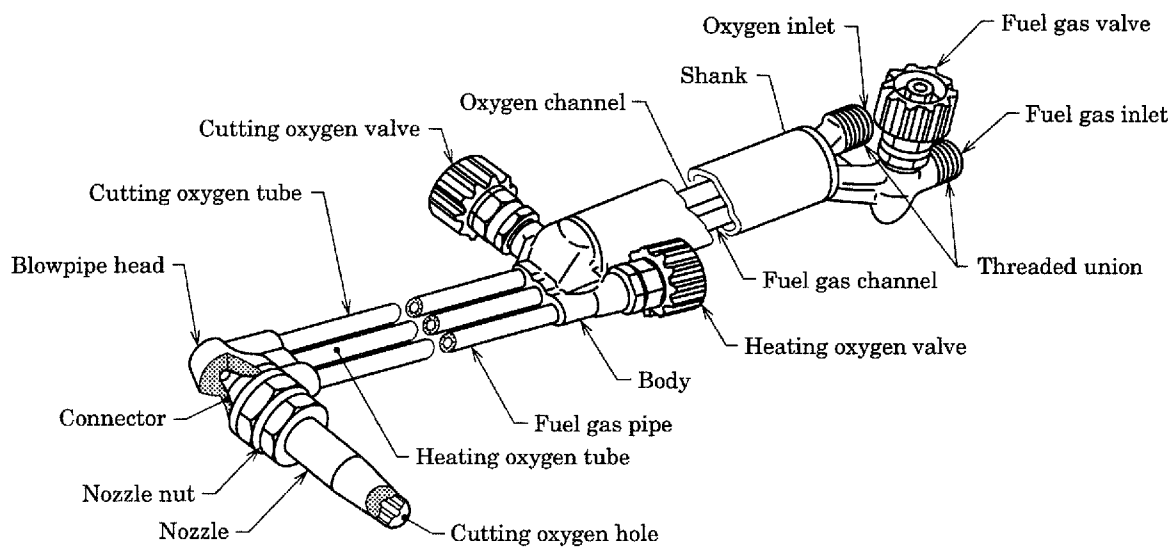
Fig. 1 Welding blowpipes

Remarks : These figures simply show the names of components, and do not specify any standards of the shape.

5.2 Cutting blowpipes The names of cutting blowpipes shall be as shown in Fig. 2.



a) Type 1 cutting blowpipe



b) Type 3 cutting blowpipe

Fig. 2 Cutting blowpipes

Remarks : These figures simply show the names of components, and do not specify any standards of the shape.

5.3 Heating blowpipes The names of heating blowpipes shall comply with those of the welding blowpipe, the cutting blowpipe and the duplex blowpipe.

5.4 Duplex blowpipes The names of each part of duplex blowpipes shall be as shown in Fig. 3.

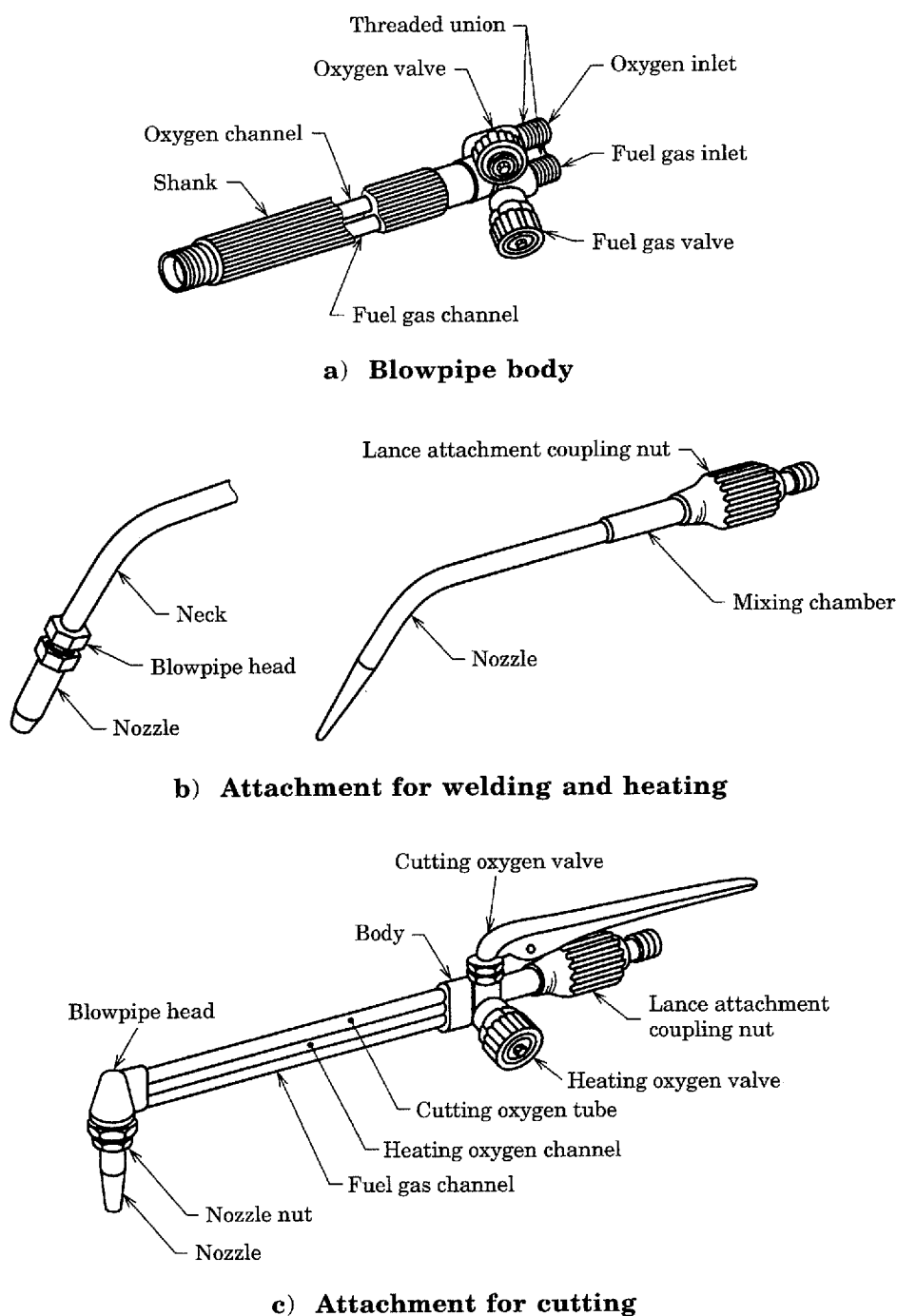


Fig. 3 Duplex blowpipes

Remarks : These figures simply show the names of components, and do not specify any standards of the shape.

6 Size

6.1 Threaded union Screws for the threaded union shall be as specified in Table 5.

Table 5 Screws for threaded union

Oxygen inlet	Fuel gas inlet
Right-hand thread	Left-hand thread
M16 × 1.5	

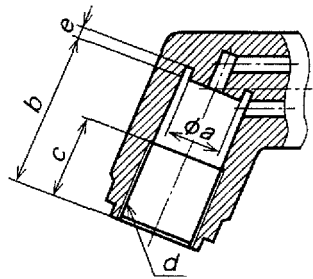
Remarks : The types of threaded unions shall comply with **JIS B 6805**.

6.2 Blowpipe head

6.2.1 Welding blowpipes Size of each part of Type A and Type B welding blowpipes shall be as specified in Tables 6 and 7. Sizes of Type SA and SB welding blowpipes are not specified.

Table 6 Sizes of blowpipe head of Type A welding blowpipes

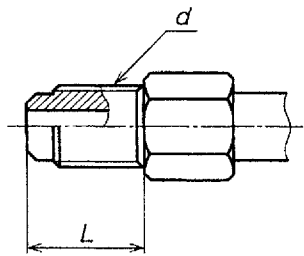
Unit: mm

Kind		<i>d</i> -part thread		<i>a</i>	<i>b</i>	<i>c</i>	<i>e</i>	
Type	Grade	Nominal	Number of threads (per 25.4 mm)					
A	1	W14	19	9	28	11 min.	2	
	2	W16	19	11	32	12 min.		
	3	W18.5	19	12	34	13 min.		

- Remarks
- 1 The reference size of *d*-part thread shall be as specified in Attached Table 1. In addition, the allowance and tolerance thereof shall be as specified in Attached Table 2.
 - 2 The thread gauge of *d*-part thread shall be as specified in Attached Tables 4 to 9.
 - 3 Other dimensional tolerances shall be in accordance with "tolerance class m" of **JIS B 0405**.

Table 7 Sizes of blowpipe head of Type B welding blowpipes

Unit: mm

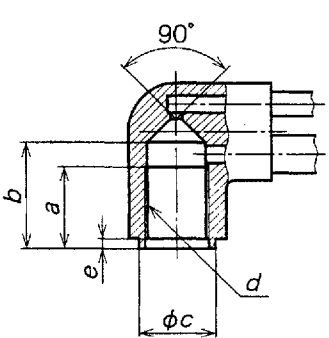
Kind		d -part thread	L	
Type	Grade			
B	00	M6 × 1	9 min.	
	0	M8 × 1	12 min.	
	01			
	1	M12 × 1.25	16 min.	
	2			

- Remarks 1 The reference profile and the reference size of metric threads shall comply with **JIS B 0205-1** and **JIS B 0205-4**.
- 2 The size allowance and tolerance of metric threads shall comply with **JIS B 0209-2**.
- 3 The thread gauge of metric threads shall comply with **JIS B 0251**.

6.2.2 Cutting blowpipes Size of blowpipe head of Type 1 and Type 3 cutting blowpipes shall be as specified in Tables 8 and 9. Sizes of Types 10, 20 and 30 cutting blowpipes are not specified.

Table 8 Sizes of blowpipe head of Type 1 cutting blowpipes

Unit: mm

Kind		<i>d</i> -part thread		<i>a</i>	<i>b</i>	<i>c</i>	<i>e</i>	
Type	Grade	Nominal	Number of threads (per 25.4 mm)					
1	1	W13.5	24	16 min.	22	16	2	
	2	W16	20	19 min.	27	20		
	3	W18				22		

- Remarks 1 The reference size of *d*-part thread shall be as specified in Attached Table 1. In addition, the allowance and tolerance thereof shall be as specified in Attached Table 2.
- 2 The thread gauge of *d*-part thread shall be as specified in Attached Tables 4 to 9.
- 3 Other dimensional tolerances shall be in accordance with "tolerance class m" of **JIS B 0405**.

Table 9 Sizes of blowpipe head of Type 3 cutting blowpipes

Unit: mm

Kind		<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	
Type	Grade									
3	1	9 to 10	16	18.7	6	4.5	7	4	7	
	2	11 to 13	19	22	7.2		9	4.5	8	
	3	15 to 17	21	22.4	9	5	8.5	5	9	

Remarks 1 Dimensional allowance not specified here shall be in accordance with "tolerance class m" of **JIS B 0405**.

2 Values *c*, *d*, *e* and *f* in the Table are informative values.

6.2.3 Heating blowpipe Sizes of the blowpipe head of the heating blowpipes are not specified.

6.3 Nozzle

6.3.1 Welding nozzle Number and hole diameter of nozzles fitted to the welding blowpipe shall be, in general, specified in Table 10. Number and hole diameter of nozzles fitted to Type SA and Type SB welding blowpipes are not specified.

Table 10 Number and hole diameter of welding nozzles

Unit: mm

Kind	Number and hole diameter of welding nozzles							
Type A, Grade 1	Number	1	2	3	5	7		
	Hole diameter	0.7	0.9	1.1	1.4	1.6		
Type A, Grade 2	Number	10	13	16	20	25		
	Hole diameter	1.9	2.1	2.3	2.5	2.8		
Type A, Grade 3	Number	30						
	Hole diameter	3.1						
Type B, Grade 00	Number	10	16	25	40			
	Hole diameter	0.4	0.5	0.6	0.7			
Type B, Grade 0	Number	50	70	100	140	200		
	Hole diameter	0.7	0.8	0.9	1.0	1.2		
Type B, Grade 01	Number	200	225	250	315	400	450	500
	Hole diameter	1.2	1.3	1.4	1.5	1.6	1.7	1.8
Type B, Grade 1	Number	250	315	400	500	630	800	1 000
	Hole diameter	1.4	1.5	1.6	1.8	2.0	2.2	2.4
Type B, Grade 2	Number	1 200	1 500	2 000	2 500			
	Hole diameter	2.6	2.8	3.0	3.2			