

JIS

JAPANESE INDUSTRIAL STANDARD

**Pneumatic system—
Flexible tubes—Tube fittings**

JIS B 8381—1995

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In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

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Pneumatic system - Flexible tubes
- Tube fittings

B 8381-1995

1. Scope This Japanese Industrial Standard specifies the flareless tube fittings (hereafter, referred to as "fittings".) to be used in connection with polyamide tubes or polyurethane tubes (hereafter, referred to as "tubes") in the pneumatic system⁽²⁾ for mechanical equipments⁽¹⁾.

In addition, the tubes of pneumatic use to be used in connection with these fittings shall be in accordance with Annex.

Notes ⁽¹⁾ Those which are used in the production such as workings and assembling.

⁽²⁾ In accordance with JIS B 8370.

Remarks 1. The standards cited in this Standard are given in the following:

JIS B 0142 Glossary of terms for oil hydraulics and pneumatics

JIS B 0203 Taper pipe threads

JIS B 0207 Metric fine screw threads

JIS B 0211 Limits of sizes and tolerances for metric fine screw threads

JIS B 1002 Dimensions of widths across flats

JIS B 8370 General rule for pneumatic systems

JIS Z 8703 Standard atmospheric conditions for testing

2. Pressures used in this Standard are gauge pressures.

2. Definitions For the purposes of this Standard, the definitions in JIS B 0142 apply.

3. Working conditions The working conditions of the fittings shall be in accordance with the following:

(1) Maximum working pressures The maximum working pressures of the fittings shall be in accordance with Table 1, being classified according to the types of the applicable tubes.

Table 1. Tubes to be applied and maximum working pressures

Unit: MPa

Tube to be applied		Maximum working pressure
Type	Symbol	
Polyamide tube class 1	AH	0.9
Polyamide tube class 2	AL	0.5
Polyurethane tube	U	0.4

(2) Ambient temperature and working air temperature -5°C to 50°C4. Types and marking symbols

4.1 Types The types of the fittings shall be in accordance with the following, being classified according to the structure, shapes, applicable tubes and fitting attaching screw threads.

(1) Types according to structure and symbols shall be in accordance with Table 2.

Table 2. Types according to structure and symbols

Type according to structure	Symbol	Applicable tube
Fastening type fittings	P	Polyamide tube
Instant type fittings	I	Polyamide tube and polyurethane tube

(2) Types according to shapes and symbols shall be in accordance with Table 3.

Table 3. Types according to shapes and symbols

Type according to shapes	Symbol	Fastening type fitting	Instant type fitting
Nipple	N	P-N type (Attached Table 1)	I-N type (Attached Table 7)
Union	U	P-U type (Attached Table 2)	I-U type (Attached Table 8)
Elbow	L	P-L type [Attached Table 3 (1)]	I-L type [Attached Table 9 (1)]
Taper threaded at centre Tee	TA	P-TA type [Attached Table 3 (2)]	I-TA type [Attached Table 9 (2)]
Taper threaded at end Tee	TB	P-TB type [Attached Table 3 (3)]	I-TB type [Attached Table 9 (3)]
Union elbow	LU	P-LU type [Attached Table 4 (1)]	I-LU type [Attached Table 10 (1)]
Union Tee	TU	P-TU type [Attached Table 4 (2)]	I-TU type [Attached Table 10 (2)]
Partition fastening union	UP	P-UP type (Attached Table 5)	I-UP type (Attached Table 11)
Female nipple	NF	P-NF type (Attached Table 6)	I-NF type (Attached Table 12)

- (3) The designations of the applicable tubes shall be in accordance with Table 4, being expressed by the outside diameters.

Table 4. Designations of applicable tubes

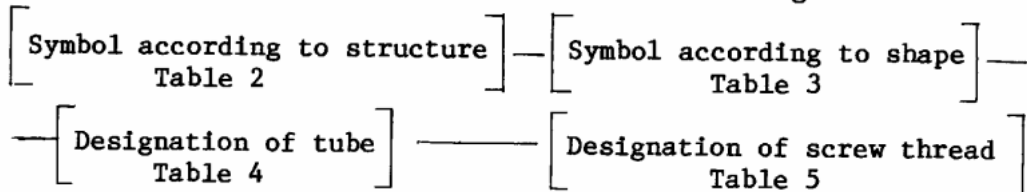
Designation	4	6	8	10	12
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- (4) The types and designations of the fitting attaching screw threads shall be in accordance with Table 5. Those of without screw threads shall be designated as "00".

Table 5. Types and designations of fitting attaching screw threads

Type of attaching screw threads	$R^{1/8}$, $Rc^{1/8}$	$R^{1/4}$, $Rc^{1/4}$	$R^{3/8}$, $Rc^{3/8}$	$R^{1/2}$, $Rc^{1/2}$
Designation	$1/8$	$1/4$	$3/8$	$1/2$

4.2 Marking symbols The expressing method of the marking symbols of the fittings shall be in accordance with the following:



Example 1. P-N-6-1/4

Example 2. I-TU-10-00

5. Performances

5.1 Flow rate characteristics The flow rate characteristics of the fittings shall be expressed by the effective sectional area, and when tested in accordance with the specifications of 10.2, the results shall be not less than the values of Table 6 to Table 8.

Remarks: The taper threaded at centre Tee Type and taper threaded at end Tee type shall be the effective sectional area of whichever the smaller one of the two outlets.

5.2 Airtightness The airtightness of the fittings, when tested in accordance with the specifications of 10.3, there shall be no leakage from the connecting part of the fitting with the tube.

5.3 Pressure resistance The pressure resistance of the fittings, when tested in accordance with the specifications of 10.4, there shall be no detachment of the tube, and breakage, crack, external leakage and other harmful defects on each part of the fittings.

5.4 Repetitious connectability The repetitious connectability of the fittings, when tested in accordance with the specifications of 10.5, shall conform to the requirements of 5.2.

Table 6. Effective sectional areas of fastening type fittings
Unit: mm²

Designation of tube	Applicable tube Outside diameter × inside diameter	Symbols																				
		P-N				P-L				P-TA				P-TB				P-NF				
		Fitting attaching screw threads																				
4	4×2.5	R ¹ / ₈	R ¹ / ₄	R ³ / ₈	R ¹ / ₂	R ¹ / ₈	R ¹ / ₄	R ³ / ₈	R ¹ / ₂	R ¹ / ₈	R ¹ / ₄	R ³ / ₈	R ¹ / ₂	R ³ / ₈	R ¹ / ₄	R ³ / ₈	R ¹ / ₂	R ³ / ₈	R ¹ / ₄	R ³ / ₈	R ¹ / ₂	
		1.5				1.5					1.5						1.5					
6	6×4	4.5	4.5			4.5	4.5				4.5	4.5				4.5			5	5		
8	8×6	16	16	16		10	14.5	14.5		10	14.5	14.5		14.5	14.5	10	14.5	14.5	16	16	16	
10	10×7.5		28	28	28		20	23	23		20	23	23		23	23	20	23	23	28	28	28
12	12×9			40	40			33	33			33	33		33	33		33	33		40	40

Table 7. Effective sectional areas of instant type fittings
(polyamide tube)
Unit: mm²

Designation of tube	Applicable tube Outside diameter × inside diameter	Symbols																																																																																																																																																																																																																																																																																																																																																					
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Table 8. Effective sectional areas of instant type fittings
(polyurethane tube)

Unit: mm²

(polyurethane tube)

Designation of tube	Applicable tube Outside diameter × inside diameter	Symbols																																																																																																																																																																																																																																																																																																																																																																										
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5.5 Pull-out strength The pull-out strength of the fittings shall be tested in accordance with the stipulations of 10.6, the results shall be not less than the values specified in Table 9.

Table 9. Pull-out strengths of fittings

Unit: N

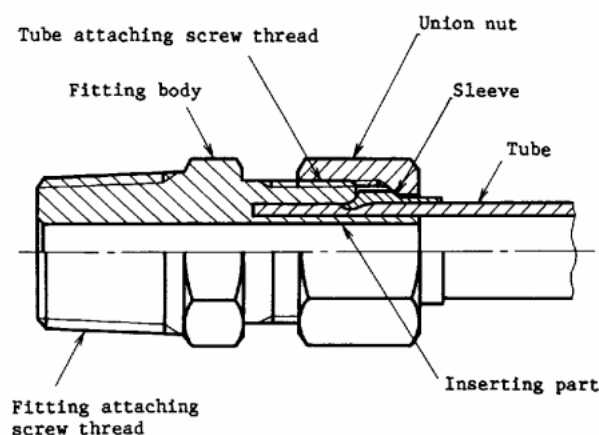
Designation of tube	Types				
	Fastening type fittings		Instant type fittings		
	Symbols of applicable tubes				
	AH	AL	AH	AL	U
4	120	90	70	60	50
6	300	220	130	100	80
8	400	280	180	140	110
10	600	460	250	190	150
12	800	600	300	220	180

5.6 Durability The durability of the fittings shall be tested in accordance with the stipulations of 10.7, and the results shall conform to the requirements of 5.2.

6. Structure The structure of the fittings shall be in accordance with the following:

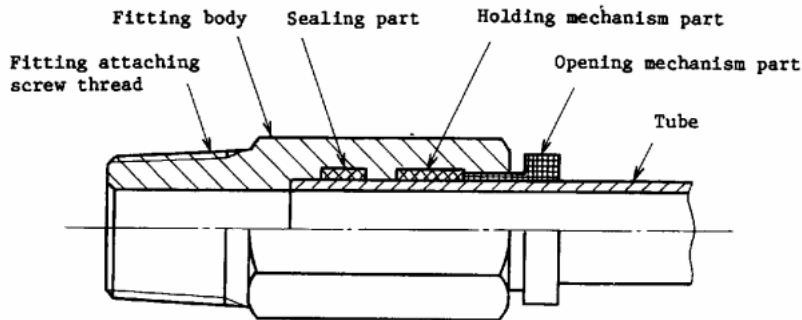
- (1) The fastening type fittings shall be so constructed as to allow the sleeve to deform by compression by the union nut or the like, after a tube was inserted, to hold and seal the tube. An example of the structure is shown in Fig. 1. However, this Figure will not be that specifies the structure.

Fig. 1. Structural example of fastening type fittings



- (2) The instant type fittings shall be so constructed as to seal tightly the tube, without using a tool or the like, by the operation of a holding mechanism part and opening mechanism part, capable of mounting and separating the tube quickly. An example of structure is shown in Fig. 2. However, this Figure will not be that specifies the structure.

Fig. 2. Structural example of instant type fittings



7. Dimensions The dimensions of the fittings shall be in accordance with the following:

- (1) The dimensions of the fittings shall be in accordance with Attached Table 1 to Table 12.
- (2) The dimensions of the tube attaching screw threads of fastening type fittings (union nut side) shall be in accordance with JIS B 0207, and the accuracies thereof shall be 6h of JIS B 0211.
- (3) The dimensions of the fitting attaching screw threads shall be in accordance with JIS B 0203.
- (4) In the fittings of which fluid passage is a straight line, the discrepancy at the meeting point, where the holes have been worked from the both sides, shall not be larger excessively.
- (5) The thicknesses of respective parts of the fittings shall be free from remarkable dispersion.

8. Appearance The appearance of the fittings shall be in accordance with the following:

- (1) The fittings shall be finished well, as well as be free from harmful flaws, cracks, burrs and other defects.
- (2) The inner and outer surfaces shall be rust-proof processed by the plating or other method. However, the portions, to which anti-corrosive material is used, may be exempt from processing.

9. Materials The materials of the fittings shall be those which satisfy 5. and 6. under the working conditions.