

JIS

The text in Japanese of this English version
has been withdrawn. June 2000

JAPANESE INDUSTRIAL STANDARD

**25 MPa {250 kgf/cm²}
bite type tube fittings
for hydraulic use**

JIS B 2351—1990

Translated and Published

by

Japanese Standards Association

Printed in Japan

242

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

Errata for JIS (English edition) are printed in *Standardization Journal*, published monthly by the Japanese Standards Association.

Errata will be provided upon request, please contact:
Business Department,
Japanese Standards Association
4-1-24, Akasaka, Minato-ku,
Tokyo, JAPAN 107
TEL. 03-3583-8002
FAX. 03-3583-0462

Errata are also provided to subscribers of JIS (English edition) in *Monthly Information*.

JAPANESE INDUSTRIAL STANDARD

J I S

25 MPa {250 kgf/cm²}
bite type tube fittings
for hydraulic use

B 2351-1990

1. Scope

This Japanese Industrial Standard specifies the bite type tube fittings ⁽¹⁾ (hereafter referred to as the "fittings") of the maximum working pressure 25 MPa {250 kgf/cm²} chiefly made from the steel pipes specified in Annex, as singled out of the family of the tube fittings for hydraulic pipings of the maximum working temperature of 120°C and the maximum working pressure of 25 MPa {250 kgf/cm²}.

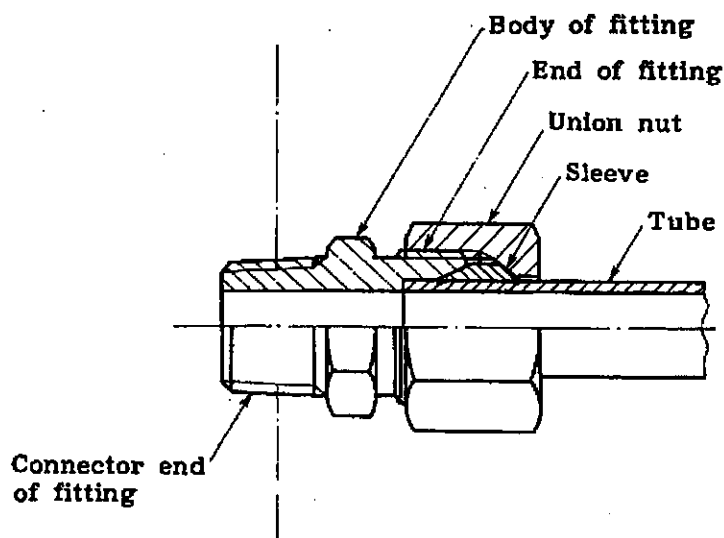
Note ⁽¹⁾ The bite type tube fitting is a type of fitting in which jointing is effected between the body of the fitting and the tube with a sleeve fitted into it, thereby hermetically sealing the pressure liquid, Fig. 1 shows an example.

Remarks 1. Applicable Standards to this Standard are shown in Attached Table 8.

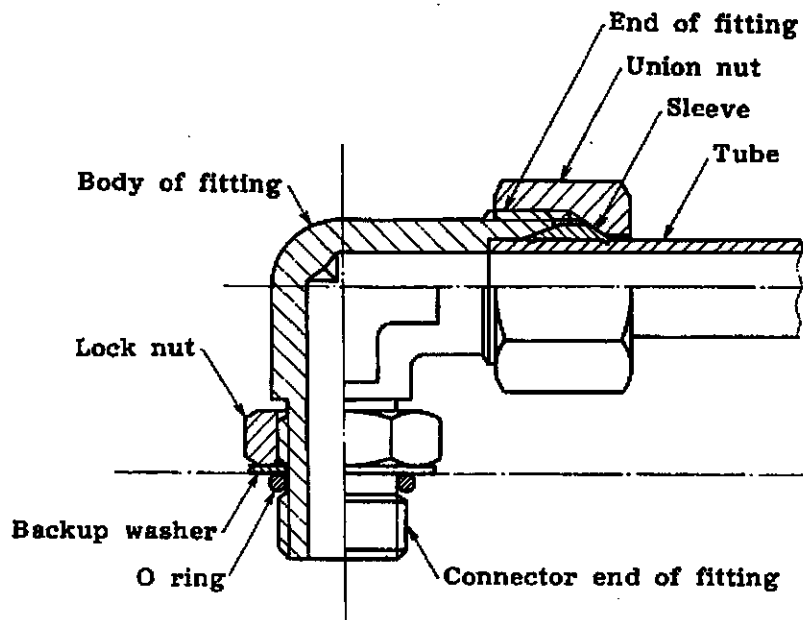
2. The units and numerical values given in { } in this Standard are based on the traditional units and are currently the criteria in force.

Fig. 1. Assembled Structure of Fitting (Example)

(a) Taper Threaded Nipple



(b) Parallel Threaded Elbow



2. Classification

The fittings shall be classified into the categories (hereafter referred to as the "type") according to the shape, the size and the type of the connector end of the fittings. The 17 types according to the shape and the type of the connector end shall be as shown in Table 1. The size types shall be divided into 11 types shown in Attached Tables 1 to 6 according to the applicable size of tube.

Table 1. Type and Symbols of Fittings

Type	Symbol	Remark
Type O parallel threaded nipple	NSO	Attached Table 1
Type E parallel threaded nipple	NSE	Attached Table 1
Taper threaded nipple	NT	Attached Table 1
Welding nipple	NW	Attached Table 2
Union	U	Attached Table 3
Bulkhead-attached threaded union	UP	Attached Table 6
Bulkhead-attached welding union	UW	Attached Table 2
Parallel threaded elbow	LS	Attached Table 4
Taper threaded elbow	LT	Attached Table 5
Union elbow	LU	Attached Table 3
Bulkhead-attached threaded union elbow	LUP	Attached Table 6
Middle T with parallel thread	TSA	Attached Table 4
Middle T with taper thread	TTA	Attached Table 5
End T with parallel thread	TSB	Attached Table 4
End T with taper thread	TTB	Attached Table 5
Union T	TU	Attached Table 3
Bulkhead-attached threaded union T	TUP	Attached Table 6

3. Quality

3.1 Thrust Condition When the fitting is tested by the method of 5.2, its sleeve shall retain a circular notch around the outer surface of the tube. In this case, there shall be no collapse ⁽²⁾ of the tube, no excess swelling in the center of the sleeve, and no cracks on the surface of the sleeve.

Note ⁽²⁾ The words "collapse of the tube" herein means the contraction of the inside diameter due to the biting of the sleeve.

3.2 Capability of Repeated Assembling When a fitting is tested by the method of 5.3.2, it shall show no leakage.

3.3 Pressure Resistance When a fitting is tested by the method of 5.3.3, it shall show neither leakage nor breakage.

3.4 Impulse Resistance When a fitting is tested by the method of 5.3.4, it shall show neither leakage nor breakage.

3.5 Flexure Resistance When a fitting is tested by the method of 5.3.5 (1) using test equipment specified in 5.3.5 (2), it shall show neither leakage nor other abnormalities.

3.6 Hardness of Product The sleeve shall have surface hardness of not less than HV 500 as a result of a suitable surface hardening treatment.

3.7 Shape and Dimensions The shape and dimensions of the fittings shall meet the following requirements:

- (1) The shape and dimensions of the fittings shall be as specified in Attached Tables 1 to 7.
- (2) The O ring used at the connector end of the parallel thread type fitting shall be as specified in JIS B 2401.
- (3) The permissible inaccuracy in the angle formed by each axis of the fittings shall be 5 mm or under for each 300 mm.
- (4) For the types of fittings with a straight fluid passage and with holes drilled from either side, the offset between the drilled holes at their meeting portion shall be moderate.
- (5) The fittings shall have no remarkable local irregularity of thickness.

3.8 Appearance The appearance of the fittings shall be as follows:

- (1) The inside and outside surfaces of the fittings shall be free from any defects harmful to use such as cracks, burrs and rust.
- (2) The complete thread portion shall be free from such defects as a scanty or missing thread.

4. Materials

The materials for the fittings shall be as follows:

- (1) The materials for the body, union nut and lock nut shall be those capable of exhibiting the same properties as those of the products of S 15 C to S 45 C specified in JIS G 4051 or similar materials. The materials for the body of the welding type fitting shall be excellent in weldability.
- (2) The materials for sleeve shall be S 10 C or S 09 CK specified in JIS G 4051 or those capable of exhibiting the same properties.
- (3) The materials for backup washer shall be SPCC or SPCD specified in JIS G 3141.

5. Test Methods

5.1 Assembling Order of Test Fitting Prior to the test, the fitting to be tested shall have the attached sleeve thrust into the tube in the procedure given below. In this case, the tube shall be the steel tube specified in Table 2.

Table 2. Dimensions of Steel Tube for Test

Unit: mm

Outside diameter of tube		4	6	8	10	12	16	20	25	30	32	38
Thickness of tube	For bite test	1	1	1	1	1	1.5	1.5	2	2	2.5	2.5
	For pressure test	1	1	1	1.5	1.5	2	2.5	3	3.5	4	4.5

Remark: The tube to serve shall be Class 2 (STPS 2) precision carbon steel tube for the bite type tube fitting specified in Annex.

- (1) Remove traces of oil from the tube.
- (2) Clamp the assembly tool or the body of the fitting in a vice, and apply lubricating oil to the surface of the threaded part and to the taper in the bore.

When the body of a fitting is used, the maximum frequency of use shall be 4 times.

- (3) Apply lubricating oil to the back of the sleeve (contact face with the union nut).
- (4) After assembling, turn the tube gently by hand to tighten the union nut gradually until the tube ceases to turn.
- (5) From the point where the tube has ceased to turn, further tighten the union nut in conformity to the criterion determined by agreement between the parties concerned with delivery.

5.2 Bite Test For the bite test, use the steel tube for the bite test specified in Table 2, assemble the parts in accordance with 5.1, expose the ring-shaped groove produced by the bite of the sleeve, and examine the degree of bite, swelling of the sleeve and for the presence of cracks on the surface.

5.3 Pressure Test

5.3.1 General Requirements for Pressure Test Carry out the pressure test of the fitting on the steel tube for the pressure test specified in Table 2. Disassemble and reassemble the fitting in accordance with 5.1, and further conform to the following requirements.

- (1) **Test Fluid** The fluid for the test shall be of viscosity grade ISO VG 32 or ISO VG 46, both Class 2 (additive) specified in JIS K 2213.
- (2) **Test Fitting** The fitting for test shall, as a rule, be of parallel thread nipple (NSO or NSE). For the flexure test, however, only parallel thread nipple or taper thread nipple (NT) shall be used.

- (3) **Tightening Value** The tightening value for reassembling shall be indicated, for all sizes of fittings, by the turning angle to be effected after the tightening torque of the union nut suddenly increases.

Minimum tightening value $\frac{1}{6}$ turn

Maximum tightening value $\frac{1}{3}$ turn

- (4) **Method of Connecting Fittings** Assemble the fitting to be subjected to the pressure test into the state (fitting assembly) in which it is connected with the steel tube specified in 5.1 and fit the end securely to the manifold of the test equipment. Suitably close the free end of the tube, and except for the flexure test, in no way fix or restrain it.

5.3.2 Repeated Assembly Test Carry out this test for two sets of two types of fittings assembled with the minimum and the maximum tightening values specified in 5.3.1 (3). Repeat a total of eight cycles of assembling and disassembling, and at the 3rd, 6th and 8th assembling, apply a load pressure two times the maximum working pressure and maintain it for 5 min and check for any leakage from junction or other parts.

At each time of disassembling, detach the pipe completely from the fitting body, whereas, at the final time, test the assembly as it is tightened with the specified tightening force.

5.3.3 Pressure Resistance Test Carry out this test for the specimen successful in the test of 5.3.2 by applying a pressure four times the maximum working pressure for 5 min and then check for a leakage or damage.

The specimen before this test shall be in the state just after the test of 5.3.2 with no treatment of increase of tightening or others.

5.3.4 Impulse Resistance Test Carry out this test for two sets of fitting assembly assembled with the minimum tightening values specified in 5.3.1 (3). Mount the fitting assemblies on the manifold of the test equipment capable of generating impulse pressure of the pattern shown in Fig. 2. The peak of the impulse pressure shall be $(133 \pm 5) \%$ of the maximum working pressure and the frequency shall be 0.5 to 1.25 Hz (30 to 70 cycle/min). The impulse pressure shall be measured with an electronic measuring instrument at the manifold on the entrance side. The fitting assemblies shall be tested with a total of 200000 impulse cycles to be checked for any leakage or damage.