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STANDARD

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 **JIS K 6333** : 1999
(including Amendment 1 : 2001)

**Gas welding equipment—
Rubber hoses for welding, cutting
and allied processes**

ICS 25.160.30; 83.140.40

Descriptors : gums, flexible pipes, oxygen, pipes, welding, gas welding, oxygen cutting, welding equipment

Reference number : JIS K 6333 : 1999 (E)

Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of International Trade and Industry through deliberations at the Japanese Industrial Standards Committee in accordance with the Industrial Standardization Law. Consequently **JIS K 6333 : 1993** is replaced with **JIS K 6333 : 1999**.

In this revision, the conformity of the Japanese Industrial Standard with **ISO/DIS 3821 : 1997** has been intended.

In addition, Amendment 1 of this Standard has been issued in March 20, 2001.

This text is compiled with the contents of Amendment 1 and the 1999 edition.

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Gas welding equipment— Rubber hoses for welding, cutting and allied processes

Introduction This Japanese Industrial Standard has been prepared based on ISO/DIS 3821 *Gas welding equipment—Rubber hoses for welding, cutting and allied processes*, published in 1997, however, a part of marking (number of standard) has not been adopted, and some contents not specified in the corresponding International Standard (such as classification of thickness of inside rubber layer, classification of nominal diameter, the maximum working pressure for acetylene in use, type 8 of test piece for adhesion test and method D of static ozone degradation test method) and some items (symbols of hose classification) have been additionally contained herein as Japanese Industrial Standard.

The portions side-lined or dotted-underlined in this Standard are the matters not included in the corresponding International Standard.

1 Scope This Standard specifies the requirements for rubber hoses (including twin hoses) for welding, cutting and allied processes⁽¹⁾ and for low pressure (limited to the hoses for maximum working pressure up to 1 MPa and with nominal diameter less than or equal to 6.3 mm) and intermediate pressure (the hoses for maximum working pressure up to 2 MPa and with all nominal diameters).

This Standard shall not be applied to plastic hoses.

Different colours and markings shall be specified for identification of the gas used.

Note ⁽¹⁾ The allied processes mean especially welding, brazing and metalizing.

Remarks 1 If hoses for low pressure are used for liquefied petroleum gases (LP gas), pressure regulators shall be used.

2 In the case of hoses for use with liquid flux dispensers fitted in the fuel gas supply line, the manufacturer should be consulted on the suitability of the hose for the application.

3 The International Standard corresponding to this Standard is indicated as follows.

ISO/DIS 3821 : 1997 *Gas welding equipment—Rubber hoses for welding, cutting and allied processes*

This Standard shall apply to hoses used in:

- gas welding and cutting;
- arc welding under the protection of an inert or active shielding gas;
- processes allied to welding and cutting.

This Standard shall not apply to hoses used for high pressure acetylene (more than 0.15 MPa).

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 coming into effect is given to these referred standards, only the edition of the indicated year constitutes the provisions of this Standard but the revision and/or

amendment(s) made thereafter are not applied. The normative references without the indication of the year of coming into effect apply limiting only to the most recent editions (including amendments).

JIS K 6250 *Rubber—General rules of physical testing methods*

Remarks : The portion cited from **ISO 4661-1** : 1993 *Rubber, vulcanized or thermoplastic—Preparation of samples and test pieces—Part 1 : Physical tests* is equivalent to the corresponding items of the said standard.

JIS K 6251 *Tensile testing methods for vulcanized rubber*

Remarks : The portion cited from **ISO 37** : 1994 *Rubber, vulcanized or thermoplastic—Determination of tensile stress-strain properties* is equivalent to the corresponding items of the said standard.

JIS K 6257 *Accelerated aging test methods for vulcanized rubber*

Remarks : The portion cited from **ISO 188** : 1982 *Rubber, vulcanized—Accelerated ageing or heat-resistance tests* is equivalent to the corresponding items of the said standard.

JIS K 6258 *Testing methods of the effect of liquids for vulcanized rubber*

Remarks : The portion cited from **ISO 1817** : 1985 *Rubber, vulcanized—Determination of the effect of liquids* is equivalent to the corresponding items of the said standard.

JIS K 6330-1 *Testing methods for rubber and plastics hoses—Part 1 : Methods of measurement of dimensions*

Remarks : The portion cited from **ISO 4671** : 1984 *Rubber and plastics hose and hose assemblies—Methods of measurement of dimensions* is equivalent to the corresponding items of the said standard.

JIS K 6330-2 *Testing methods for rubber and plastics hoses—Part 2 : Hydrostatic testing*

Remarks : The portion cited from **ISO 1402** : 1984 *Rubber and plastics hoses and hose assemblies—Hydrostatic testing* is equivalent to the corresponding items of the said standard.

JIS K 6330-4 *Testing methods for rubber and plastics hoses—Part 4 : Sub-ambient temperature flexibility tests*

Remarks : The portion cited from **ISO 4672** : 1988 *Rubber and plastics hoses—Subambient temperature flexibility tests* is equivalent to the corresponding items of the said standard.

JIS K 6330-6 *Testing methods for rubber and plastics hoses—Part 6 : Determination of adhesion between components*

Remarks : The portion cited from **ISO 8033** : 1991 *Rubber and plastics hose—Determination of adhesion between components* is equivalent to the corresponding items of the said standard.

JIS K 6330-7 *Testing methods for rubber and plastics hoses—Part 7 : Assessment of ozone resistance under static conditions*

Remarks : The portion cited from **ISO 7326** : 1991 *Rubber and plastics hoses—Assessment of ozone resistance flexibility tests* is equivalent to the corresponding items of the said standard.

JIS K 6330-9 *Testing methods for rubber and plastics hoses—Part 9 : Bending tests*

Remarks : **ISO 1746** : 1983 *Rubber or plastics hoses and tubing—Bending tests* is identical with the said standard.

JIS Z 8601 *Preferred numbers*

Remarks : The portion cited from **ISO 3** : 1973 *Preferred number—Series of preferred number* is equivalent to the corresponding items of the said standard.

ISO 1307 : 1992 *Rubber and plastics hoses for general-purpose industrial applications—Bore diameters and tolerances, and tolerances on length*

ISO 4080 : 1991 *Rubber and plastics hoses and hose assemblies—Determination of permeability to gas*

3 Classification and construction of hose

3.1 Classification Hoses shall consist of inside rubber layer, reinforced layer and outside rubber layer, and shall be classified by thickness of inside rubber layer as given in Table 1.

Table 1 Classification of hose

Classification of hose	Thickness of inside rubber layer	Thickness of outside rubber layer
Type 1	1.3 mm or over	1.0 mm or over
Type 2	1.5 mm or over	

3.2 Manufacture Both inside rubber layer and outside rubber layer shall be of uniform thickness and free from holes, porosity and other defects. Reinforced layer shall be processed by appropriate technique.

4 Dimensions and tolerances

4.1 Nominal bore (internal diameter) The internal diameter of the hoses shall be in accordance with the dimensions shown in Tables 2 and 3.

4.2 Concentricity (total indicated reading) The concentricity of the hose, measured in accordance with **JIS K 6330-1**, shall be in accordance with the values given in Tables 2 and 3.

Table 2 Nominal bore (internal diameter), tolerance and concentricity of single hose

Unit : mm

Nominal bore (internal diameter)	Tolerance	Concentricity
4.0 5.0 6.3	± 0.55	1.0 max.
7.1 8.0 9.5 10.0	± 0.65	1.25 max.
12.5 16.0	± 0.70	
20.0	± 0.75	1.50 max.
Remarks 1 The tolerances and internal diameters (excluding nominal bore of 20 mm) do not comply with table 1 of ISO 1307 : 1992 . 2 For intermediate dimensions, numbers should be chosen from the R20 series of JIS Z 8601 with tolerances as for the next larger internal diameter shown in Table 2.		

Table 3 Nominal bore (internal diameter), tolerance and concentricity of twin hose

Unit : mm

Nominal bore	Internal diameter and tolerance	Concentricity
5.0×5.0	$5.0 \pm 0.55 \times 5.0 \pm 0.55$	1.0 max. for nominal bore 5.0
6.3×9.5	$6.3 \pm 0.55 \times 9.5 \pm 0.65$	1.0 max. for nominal bore 6.3, 1.25 max. for nominal bore 9.5
7.1×7.1	$7.1 \pm 0.65 \times 7.1 \pm 0.65$	1.25 max. for nominal bore 7.1
8.0×8.0	$8.0 \pm 0.65 \times 8.0 \pm 0.65$	1.25 max. for nominal bore 8.0
8.0×9.5	$8.0 \pm 0.65 \times 9.5 \pm 0.65$	1.25 max. for nominal bore 8.0, 1.25 max. for nominal bore 9.5
Remarks 1 The tolerances and internal diameters (excluding nominal bore of 20 mm) do not conform to table 1 of ISO 1307 : 1992 . 2 For the nominal bore of twin hoses, those for oxygen hose are indicated in front of symbol × and those for fuel gas hose other than oxygen hose are indicated in the back.		

4.3 Tolerance of cut lengths The tolerance of cut lengths shall conform to Table 4. Table 4 shall be based on the provision of **ISO 1307**.

Table 4 Tolerance of cut lengthUnit : mm for the numeral value
without indication

Length	Tolerance
300 or less	± 3
Over 300 up to and incl. 600	± 4.5
Over 600 up to and incl. 900	± 6
Over 900 up to and incl. 1 200	± 9
Over 1 200 up to and incl. 1 800	± 12
Over 1 800	$\pm 1 \%$

5 Physical properties of inside rubber layer and outside rubber layer

5.1 Tensile strength and elongation at break The rubber used in inside rubber layer and outside rubber layer shall be tested in accordance with the method specified in **JIS K 6251** and conformed to the requirements of Table 5.

Table 5 Tensile strength and elongation at break

	Tensile strength MPa	Elongation at break %
Inside rubber layer	5 min.	200 min.
Outside rubber layer	7 min.	250 min.

5.2 Aging test After aging for 7 days at a temperature of $70\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ as specified in **JIS K 6257**, the tensile strength and elongation at break shall be tested in accordance with the method as specified in **JIS K 6251** and shall not decrease from the values before aging by more than 25 % and 50 % respectively.

5.3 Non-ignition test for oxygen hoses Non-ignition test shall be carried out either according to Annex A, and three samples of the inside rubber layer shall remain in the apparatus at a constant temperature of $360\text{ }^{\circ}\text{C}$ to $365\text{ }^{\circ}\text{C}$ for 2 min without ignition.

If more than one of the samples show evidence of ignition in less than 2 min, the hose shall be considered not to comply. If only one sample shows evidence of ignition in less than 2 min, three further samples shall be prepared and tested. If any of the three samples in this second series shows evidence of ignition in less than 2 min, the hose shall be deemed not to comply.

5.4 Test for resistance to liquids

5.4.1 Resistance to acetone and dimethylformamide (DMF) for acetylene hoses and all fuel gas hoses⁽²⁾ A sample of the inside rubber layer, when immersed in the test solvent at standard laboratory temperature as defined in **JIS K 6250** for 70 h, shall not increase in mass by more than 8 % when calculated in accordance with the method in **JIS K 6258**.