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(JRMA/JSA)

**Rubber hoses and tubing for cooling
systems for internal-combustion engines
— Specification**

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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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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 Rubber Manufacturers Association (JRMA)/ Japanese Standards Association (JSA) 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 D 2602 : 1999** is replaced with this Standard.

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Rubber hoses and tubing for cooling systems for internal-combustion engines — Specification

Introduction

This Japanese Industrial Standard has been prepared based on the second edition of ISO 4081 published in 2005 with some modifications of the technical contents.

The portions given sidelines or dotted underlines are the matters in which the contents of the corresponding International Standard have been modified. A list of modifications with the explanations is given in Annex JB.

Warning Persons using this Standard should be familiar with normal laboratory practice. This Standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices.

1 Scope

This Standard specifies the rubber hoses and tubing (hereafter referred to as “hoses”) for cooling systems of the internal-combustion engines which utilize the anti-freeze coolant of 1, 2-ethanediol as a main component for private vehicles and commercial vehicles whose unladen mass (according to the definition of JIS D 0102) is 3.5 t or under.

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

ISO 4081 : 2005 *Rubber hoses and tubing for cooling systems for internal – combustion engines – Specification* (MOD)

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.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. For the standards with the indication of year, only the edition of the indicated year shall be applied but not any revisions made thereafter (including amendments). For those with no indication of year, the most recent edition (including amendments) shall be applied.

JIS D 0102 *Road vehicles — Dimensions, masses, weights and performances —*

Vocabulary

NOTE : Corresponding International Standard : ISO 1176 *Road vehicles — Masses — Vocabulary and codes* (MOD)

JIS K 6250 *Rubber — General procedures for preparing and conditioning test pieces for physical test methods*

NOTE : Corresponding International Standard : ISO 23529 *Rubber — General procedures for preparing and conditioning test pieces for physical test methods* (MOD)

JIS K 6257 *Rubber, vulcanized or thermoplastic — Determination of heat ageing properties*

NOTE : Corresponding International Standard : ISO 188 *Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests* (MOD)

JIS K 6258 *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

NOTE : Corresponding International Standard : ISO 1817 *Rubber, vulcanized — Determination of the effect of liquids* (MOD)

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

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

NOTE : Corresponding International Standard : ISO 1402 *Rubber and plastics hoses and hose assemblies — Hydrostatic testing* (MOD)

JIS K 6330-3 : 1998 *Testing methods for rubber and plastics hoses — Part 3 : Determination of suction resistance*

NOTE : Corresponding International Standard : ISO 7233 : 1991 *Rubber and plastics hoses and hose assemblies — Determination of suction resistance* (MOD)

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

NOTE : Corresponding International Standard : ISO 4672 *Rubber and plastics hoses — Sub-ambient temperature flexibility tests* (MOD)

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

NOTE : Corresponding International Standard : ISO 8033 *Rubber and plastics hoses — Determination of adhesion between components* (MOD)

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

NOTE : Corresponding International Standard : ISO 7326 *Rubber and plastics hoses — Assessment of ozone resistance under static conditions* (MOD)

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

properties of hoses and tubing

NOTE : Corresponding International Standard : ISO/DIS 1746 *Rubber or plastics hoses and tubing — Bending tests* (IDT)

JIS K 6397 *Rubbers and latices — Nomenclature*

NOTE : Corresponding International Standard : ISO 1629 *Rubbers and latices — Nomenclature* (MOD)

ISO 1307 *Rubber and plastics hoses — Hose sizes, minimum and maximum inside diameters, and tolerances on cut-to-length hoses*

ISO 6162-1 *Hydraulic fluid power — Flange connectors with split or one-piece flange clamps and metric or inch screws — Part 1 : Flange connectors for use at pressures of 3.5 MPa (35 bar) to 35 MPa (350 bar), DN 13 to DN 127*

SAE J1638 *Compression Set of Hoses or Solid Discs*

SAE J1684 : 2000 *Test Method for Evaluating the Electrochemical Resistance of Coolant System Hoses and Materials*

NOTE : SAE Standards are available at the Web site of Society of Automotive Engineers, Inc. (<http://www.sae.org>).

3 Classification

Hoses shall be classified according to the structure (rubber hose and tube) and the type (ambient operating temperature), and shall be as given in table 1.

Table 1 Classification of hose

Structure	Type (ambient operating temperature range)
Rubber hose ^{a)}	Type 1 : – 40 °C to + 100 °C Type 2 : – 40 °C to + 125 °C
Tube ^{a)}	Type 3 : – 40 °C to + 150 °C Type 4 : – 40 °C to + 175 °C
Note ^{a)} The rubber hose has an integral reinforcement layer but the tube does not.	

4 Sizes and tolerances thereof

The sizes of nominal diameter (inside diameter) of hoses and tolerances thereof shall be in accordance with ISO 1307, or shall be under the agreement between the parties concerned with delivery. The measurement method of sizes shall be in accordance with JIS K 6330-1.

5 Performance requirements for hoses

The performance requirements of hoses shall be tested in accordance with clause 6, and the rubber hose shall conform to table 2 and the tube shall conform to table 3.

Table 2 Characteristics of rubber hose (Type 1 to Type 4)

Performance requirement	Unit	Value	Test method (Clause applied)
a) Resistance to burst pressure			6.2
Nominal diameter (inside diameter) 18 mm or under	MPa	1.2 min.	
Nominal diameter (inside diameter) Over 18 mm to and incl. 35 mm	MPa	0.9 min.	
Nominal diameter (inside diameter) Over 35 mm	MPa	0.5 min.	
b) Adhesion			6.3
As manufactured condition	kN/m	1.75 min.	
After tests of i), k) and l)	kN/m	1.25 min.	
c) Low-temperature flexibility			6.4
Appearance	—	No cracking generates.	
Resistance to burst pressure after test			
Nominal diameter (inside diameter) 18 mm or under	MPa	1.2 min.	
Nominal diameter (inside diameter) Over 18 mm to and incl. 35 mm	MPa	0.9 min.	
Nominal diameter (inside diameter) Over 35 mm	MPa	0.5 min.	
d) Resistance to collapse			6.5
Outside diameter change rate			
Nominal diameter (inside diameter) 16 mm or under	%	30 max.	
Nominal diameter (inside diameter) Over 16 mm to and incl. 25 mm	%	30 max.	
Nominal diameter (inside diameter) Over 25 mm	%	30 max.	
e) Resistance to kinking			6.6
Coefficient of deformation (T/D)			
Nominal diameter (inside diameter) 10.5 mm or under	—	<u>0.7 min.</u>	
Nominal diameter (inside diameter) Over 10.5 mm to and incl. 16.5 mm	—	<u>0.7 min.</u>	
Nominal diameter (inside diameter) Over 16.5 mm to and incl. 19.5 mm	—	<u>0.7 min.</u>	
f) Resistance to dilation			6.7
Dilation	%	12 min.	
g) Resistance to electrochemical degradation			6.8
Appearance	—	No cracking or striation generates.	
h) Resistance to ozone			6.9
Appearance	—	No cracking generates.	
i) Resistance to heat ageing			6.10
Adhesion	kN/m	1.25 min.	
Low-temperature flexibility : Appearance	—	No cracking generates.	
Resistance to burst pressure after low-temperature flexibility test			
Nominal diameter (inside diameter) 18 mm or under	MPa	1.2 min.	
Nominal diameter (inside diameter) Over 18 mm to and incl. 35 mm	MPa	0.9 min.	
Nominal diameter (inside diameter) Over 35 mm	MPa	0.5 min.	
Resistance to ozone : Appearance		No cracking generates.	
j) Compression set	%	50 max.	6.11