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Gas-cords

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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 Japan Industrial Association of Gas and Kerosene Appliances (JGKA)/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 S 2146:2009** is replaced with this Standard.

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Gas-cords

Introduction

This Japanese Industrial Standard was established in 1985 and has been revised three times up to the present. The revision at this time has been made to update the contents to correspond to changes in actual usage of the product seen since the last revision in 2009.

No corresponding International Standard has been established at this point.

1 Scope

This Standard specifies gas-cords for general domestic use intended for indoor connection of the portable gas appliances for town gas or liquefied petroleum gas (hereafter referred to as “gas”) of gas pressure 3.3 kPa or under with gas taps.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) listed below shall be applied.

JIS B 7411 *Solid-stem general purpose liquid-in-glass thermometers*

JIS B 7502 *Micrometer callipers*

JIS B 7507 *Vernier, dial and digital callipers*

JIS B 7516 *Metal rules*

JIS G 3314 *Hot-dip aluminium-coated steel sheet and strip*

JIS G 3446 *Stainless steel pipes for machine and structural purposes*

JIS G 3459 *Stainless steel pipes*

JIS G 4303 *Stainless steel bars*

JIS G 4304 *Hot-rolled stainless steel plate, sheet and strip*

JIS G 4305 *Cold-rolled stainless steel plate, sheet and strip*

JIS G 4308 *Stainless steel wire rods*

JIS G 4309 *Stainless steel wires*

JIS G 4313 *Cold rolled stainless steel strip for springs*

JIS G 4314 *Stainless steel wires for springs*

JIS G 4318 *Cold finished stainless steel bars*

JIS H 3100 *Copper and copper alloy sheets, plates and strips*

JIS H 3250 *Copper and copper alloy rods and bars*

JIS H 3260 *Copper and copper alloy wires*

JIS H 3300 *Copper and copper alloy seamless pipes and tubes*

JIS H 3320 *Copper and copper alloy welded pipes and tubes*

- JIS H 4000 *Aluminium and aluminium alloy sheets, strips and plates*
- JIS H 4040 *Aluminium and aluminium alloy rods, bars and wires*
- JIS H 4080 *Aluminium and aluminium alloys extruded tubes and cold-drawn tubes*
- JIS H 4090 *Aluminium and aluminium alloy welded pipes and tubes*
- JIS H 4100 *Aluminium and aluminium alloy extruded shape*
- JIS H 5120 *Copper and copper alloy castings*
- JIS H 5121 *Copper alloy continuous castings*
- JIS H 5202 *Aluminium alloy castings*
- JIS H 5301 *Zinc alloys die castings*
- JIS H 5302 *Aluminium alloy die castings*
- JIS K 2240 *Liquefied petroleum gases*
- JIS K 6250 *Rubber—General procedures for preparing and conditioning test pieces for physical test methods*
- JIS K 6251 *Rubber, vulcanized or thermoplastics—Determination of tensile stress-strain properties*
- JIS K 6257 *Rubber, vulcanized or thermoplastic—Determination of heat ageing properties*
- JIS K 6258 *Rubber, vulcanized or thermoplastic—Determination of the effect of liquids*
- JIS K 6330-7 *Rubber and plastics hoses—Part 7: Assessment of ozone resistance under static conditions*
- JIS S 2091 *Gas and kerosene appliances for domestic use, and their accessories—Glossary*
- JIS S 2135 *Quick coupling unit for gas appliances*
- JIS Z 2371 *Methods of salt spray testing*

3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in **JIS S 2091** and the following apply.

See Annex A for names of each part.

3.1 town gas

gas belonging to the gas group as given in Appendix 3 of the Ministerial Ordinance on the Technical Standards for Gas Appliances (Ordinance No. 27 of the Ministry of International Trade and Industry, 1971) based on the Gas Business Act (Act No. 51, 1954)

3.2 liquefied petroleum gas

gas conforming to the “Standards for liquefied petroleum gas” specified in the Ordinance for Enforcement (Ordinance No. 11 of the Ministry of International Trade and Industry, 1997) of the Act Concerning the Securing of Safety and the Optimization of Transaction of Liquefied Petroleum Gas (Act No. 149, 1967)

3.3 portable gas burning appliances

gas burning appliances that can be carried, such as portable heaters and portable gas cookers

3.4 quick coupling unit

easily attachable/detachable coupling unit having such a construction that, in case of disconnection of the connecting part, gas leakage from the supply end does not occur

3.5 hose

hose of nominal diameter less than 9.5 (10 mm in inside diameter), which consists of an inner rubber layer, an outer layer and a layer reinforced by a material such as steel wire

3.6 gas-cord

cord for gas use consisting of a hose and quick coupling units attached at both ends of the hose

NOTE : See Annex B for types of application of gas-cords.

4 Performance**4.1 Performance of gas-cord**

The performance of gas-cords, when tested according to 8.2, shall satisfy the requirements given in table 1.

Table 1 Performance of gas-cords

Item		Performance	Summary of test conditions	Applicable subclause
Airtightness		① There shall be no external leakage.	Air pressure of 4.2 kPa	8.2.1
		② The transit leakage passing through safety mechanism shall be 0.55 L/h max.		
		③ There shall be no leakage at the time of abnormality.		
Attaching/detaching behaviour		It shall be smooth and secure.	—	8.2.2
Attaching/detaching force	Connecting force	60 N max.	—	8.2.3
	Disconnecting force	30 N max.	—	
Repeated use	Connecting part	Requirements for airtightness (①②③) and attaching/detaching behaviour shall be met.	6 000 times at a rate of 10 times/min to 20 times/min.	8.2.4
	Adjustable part	Requirements for airtightness (①) shall be met.	6 000 times at a rate of 5 times/min to 20 times/min.	

Table 1 (concluded)

Item	Performance	Summary of test conditions	Applicable subclause
Tensile strength of attaching/detaching part	The disconnection shall not occur. Requirements for airtightness (①②) and attaching/detaching behaviour shall be met.	Load of 400 N is applied to the axial direction and to the direction vertical to the axial direction of the quick coupling unit.	8.2.5
Pull-out strength of connecting part of quick coupling unit and hose	The quick coupling unit and the hose shall not disconnect under tensile load of less than 300 N.	Tensile speed of the tension tester 100 mm/min	8.2.6
Load resistance	Requirements for airtightness (①②) and attaching/detaching behaviour shall be met.	350 N	8.2.7
Impact resistance	Requirements for airtightness (①②) and attaching/detaching behaviour shall be met.	2 J	8.2.8
Flame resistance	The gas-cord shall not continue burning with flame for more than 5 s.	—	8.2.9
Thermal resistance	There shall be no abnormalities such as leakage.	120 °C ± 2 °C, for 30 min	8.2.10
Low temperature resistance	There shall be no abnormalities such as leakage.	−10 °C ± 2 °C, for 30 min	8.2.11
Flow rate	400 L/h min.	Measurement of the air flow rate with the gas-cord wound half around a cylinder of 90 mm diameter when the pressure has dropped by 0.3 kPa, and conversion of the measured air flow rate to that under standard condition.	8.2.12

4.2 Performance of hose

The performance of hose, when tested according to **8.3**, shall satisfy the requirements given in table 2.

Table 2 Performance of hose

Item		Performance	Summary of test conditions	Applicable subclause	
Hose	Blocking resistance	Decrease of flow rate 50 % or less	Placing a weight of 60 kg mass on the hose over the length of 100 mm for 1 min under the condition of the atmospheric pressure of 1.0 kPa and the flow rate of 0.5 kl/h, and measurement of the flow rate.	8.3.1	
	Cutting resistance	There shall be no leakage.	Placing of a weight of 6 kg mass on the hose for 5 min, followed by the airtightness test.	8.3.2	
	Gas permeation resistance	Gas permeation 5 ml/h max.	Application of propane gas at 60 kPa ± 1 kPa at the temperature of 35.0 °C ± 0.2 °C for 24 h, followed by measurement for 6 h.	8.3.3	
Inner rubber layer and outer layer	Tensile	Tensile strength	10 MPa min.	The method specified in JIS K 6251 is used.	8.3.4
		Elongation at break			
	Ageing	Change rate of tensile strength	-20 % max.	70 °C ± 1 °C, for 240 h	8.3.5
		Change rate of elongation at break	-20 % max.		
Outer layer	Static ozone degradability		There shall be no abnormalities such as cracks and fissures.	Method D in JIS K 6330-7 is used. Winding of the hose around a cylinder with a diameter four times the hose outer diameter, and subjecting to condition of ozone concentration of 500 ppb ± 50 ppb and temperature of 40 °C ± 2 °C for 120 h.	8.3.6
	Immersion	Vinegar resistance	The mass change rate shall be 12 % or less, and there shall be no embrittlement, softening, swelling or shrinking detrimental to service.	Immersion in 4 % vinegar water solution at 25 °C ± 5 °C for 24 h	8.3.7
		Edible oil resistance	The mass change rate shall be 5 % or less, and there shall be no embrittlement, softening, swelling or shrinking detrimental to service.	Immersion in soybean oil at 25 °C ± 5 °C for 24 h	
		Soy sauce resistance		Immersion in soy sauce at 25 °C ± 5 °C for 24 h	
		Liquid soap resistance	The mass change rate shall be 8 % or less, and there shall be no embrittlement, softening, swelling or shrinking detrimental to service.	Immersion in 2 % sodium laurate water solution at 25 °C ± 5 °C for 24 h	

Table 2 (concluded)

Item			Performance	Summary of test conditions	Applicable subclause
Outer layer	Immersion	Neutral detergent resistance	The mass change rate shall be 5 % or less, and there shall be no embrittlement, softening, swelling or shrinking detrimental to service.	Immersion in 2 % sodium <i>n</i> -laurylbenzenesulfonic acid water solution at 25 °C ± 5 °C for 24 h	8.3.7
		Bleaching agent resistance		Immersion in 10 % sodium hypochlorite water solution at 25 °C ± 5 °C for 24 h	
Inner rubber layer	<i>n</i> -Pentane resistance		The mass change rate shall be 35 % or less	Subjecting to <i>n</i> -pentane gas at temperature of 35 °C ± 2 °C for 48 h.	8.3.8

5 Construction and dimensions

5.1 Construction

The construction of each part of gas-cord shall be as follows.

- The gas-cord shall consist of a hose and quick coupling units fitted at both ends of the hose.
- The hose and the quick coupling units shall be connected rigidly in a manner not allowing easy disconnection and the connecting parts shall be free from gas leakage or disconnection, so that the gas-cord can fully function as a connecting tool of a gas tap and a gas appliance.
- The protective cap for preventing foreign matter from adhering to the inside of the quick coupling unit shall be attached in such a manner that the cap is not easily lost.

5.2 Quick coupling unit

5.2.1 Construction

Each part of the quick coupling unit shall be manufactured with safety and durability considerations, to have a construction free from breakage or deformation detrimental to service when used under normal use conditions, and shall be as follows.

The construction shall be checked by the test described in 8.4.

- Edges of each part shall be smooth.
- The connection of the quick coupling units shall be secure.
- The quick coupling unit (gas appliance side) to be connected to gas appliance shall be provided with a safety mechanism for preventing gas leakage.

5.2.2 Dimensions

The dimensions shall be as follows.

The dimensions shall be checked by the test described in 8.4.