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JAPANESE INDUSTRIAL STANDARD

Metallic flexible hoses for gas

JIS S 2145—1991

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In the event of any doubt arising,
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Metallic flexible hoses for gas

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1. Scope

This Japanese Industrial Standard specifies metallic flexible hoses for gas hereafter referred to as hoses to be used for connecting the fixed type gas combustion appliance⁽²⁾ to be used for liquified petroleum gas or city gas⁽¹⁾ of not more than 3.24 kPa {330 mm H₂O} in pressure with the gas plug.

Notes (1) The liquified petroleum gas means the gas described in "Standard of liquified petroleum gas" of executive regulation (1968, Ministerial Ordinance of Ministry of International Trade and Industry No. 14) based on the Law Concerning the Securing of Safety and the Optimization of Transaction of Liquified Petroleum Gas (1967, Law No. 149).

The city gas means the gas group described in Ministerial Ordinance relating to verification and the like of product for gas (1971, Ministerial Ordinance of Ministry of International Trade and Industry No. 27) based on the Gas Utility Industry Law (1954, Law No. 51).

(2) The fixed type gas combustion appliances mean the gas combustion appliances which do not travel after setting such as water heater, range, etc.

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

2. In this Standard the units and numerical values shown in { } are in accordance with the traditional units and, appended for informative reference.

2. Classification

The classification of hoses, according to application gas type, material quality of flexible tube hereafter referred to as tube and connecting metal fitting, shall be as given in Tables 1 to 3.

Table 1. Application gas types

Type	Symbol
Liquefied petroleum gas, and city gas common use	G
Liquefied petroleum gas exclusive use	L

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Table 2. Material quality of tubes

Classification	Symbol
Copper alloy	C
Stainless steel	S

Table 3. Classification of connecting metal fittings

Classification	Symbol	Remarks
Taper pipe external thread connecting metal fitting	T	The connecting seal part seals the R thread surface
Taper pipe internal thread connecting metal fitting	TI	The connecting seal part seals the Rc thread surface
Taper external thread connecting metal fitting for 90° bending pipe	90T	T of 90° bending
Taper internal thread connecting metal fitting for 90° bending pipe	90 TI	TI of 90° bending
Hose end connecting metal fitting	H	The fitting of exclusive use for liquefied petroleum gas to be connected with hose end.

3. Performance

3.1 Performance of hose The performance of hose, shall be subjected to the test according to 10.3 and, comply with the specification of Table 4.

Table 4. Performance

Application	Item	Test	Performance	Main test conditions	Applicable test item
Hose	Air tightness	Air tightness	To be free from leakage	19.6 kPa {0.2 kgf/cm ² }, for 1 min	10.3.1
	Pressure resistance	Pressure resistance	To be free from leakage and other abnormalities	784 kPa {8 kgf/cm ² }, for 30 s	10.3.2
	Tensile strength	Tension	To be free from abnormalities such as exfoliation of connecting metal fitting, rupture of hose, etc.	Tensile load corresponding to nominal diameter, for 5 min	10.3.3
		Air tightness		Tensile load test, 19.6 kPa {0.2 kgf/cm ² }, for 1 min	
	Torsion strength	Torsion	To be free from rupture, fissuring and other abnormalities	90° torsion, 10 times	10.3.4
		Air tightness	To be free from leakage	After torsional test 19.6 kPa {0.2 kgf/cm ² }	
	Bending strength	Bending	To be free from fissuring and other abnormalities	180° bending, 30 times	10.3.5
		Air tightness	To be free from leakage	After bending test, 19.6 kPa {0.2 kgf/cm ² }	
		Impact	To be free from fissuring and other abnormalities	Falling down of steel ball of 2 kg from the height of 1 m	
	Impact resistance	Impact	To be free from leakage	After impact test, 19.6 kPa {0.2 kgf/cm ² }	10.3.6

Application	Item		Test	Performance	Main test conditions	Applicable test item
Hose	Impact resistance	Connecting metal fitting	Impact	To be free from abnormalities such as rupture	Impact force corresponding to nominal diameter	10.3.6
			Air tightness	To be free from leakage	After impact test, 19.6 kPa {0.2 kgf/cm ² }	
	Repeating use resistance (limited to flare joint)		Repeat attaching	To be free from abnormalities	Under clamping conditions corresponding to nominal diameter, 8 times	10.3.7
			Air tightness	To be free from leakage	After repeating attaching test, 19.6 kPa {0.2 kgf/cm ² }	
	Heat resistance		Heat resistance	To be free from abnormalities such as fissuring	120 ± 2°C, for 30 min	10.3.8
			Air tightness	To be free from leakage	After heat resistance test, 19.6 kPa {0.2 kgf/cm ² }	
	Stress corrosion resistance		Exposure immersion	To be free from abnormalities such as fissuring and the like	Made of copper alloy: 180° bending, in ammonia atmospheric gas for 18 h. Made of stainless steel: 180° bending, in the mixed solution of sodium chloride and sodium nitrite, for 14 h	10.3.9
			Air tightness	To be free from leakage	After exposure (immersion) test, 19.6 kPa {0.2 kgf/cm ² }	

Application	Item	Test	Performance			Main test conditions	Applicable test item		
Hose	Flow rate	Flow rate	Nominal diameter of hose		Flow rate m ³ /h	Flow air at entering pressure 2.75 kPa {280 mmH ₂ O}, and at pressure difference corresponding to the length.	10.3.10		
					9.5 A			3/8 B	0.95 min.
			Those of thread connecting		13 A			1/2 B	1.60 min.
					19 A			3/4 B	4.15 min.
					25 A			1 B	8.30 min.
			Those of hose end connecting		32 A			1-1/4 B	14.50 min.
					9.5 A			3/8 B	0.80 min.
			Those of hose end connecting		13 A			1/2 B	1.50 min.
	Nominal diameter of hose				Bending force N {kgf}	90° bending	10.3.11		
	13 A max.	1/2 B max.	49{5} max.						
	19 A	3/4 B	78{8} max.						
25 A min.	1 B min.	108{11} max.							

Application	Item	Test	Performance	Main test conditions	Applicable test item
Protective film coating	Adherence	Bending	To be free from cracks, exfoliation and other abnormalities	180° bending, 15 times	10.3.5
		Torsion		90° torsion, 10 times	10.3.4
	Solution resistance	Detergent resistance	To be free from cracks, exfoliation, corrosion of tube, and other abnormalities	2 % sodium <i>n</i> -lauryl-benzene sulfonate water solution 40 ± 5°C, 168 h	10.3.12
		Food-oil resistance		Soybean oil 25 ± 5°C, 24 h	
		High temperature food oil resistance		Soybean oil 155 ± 5°C, for 10 s	
		Food-acetic acid resistance		4.5 % acetic acid water solution, 25 ± 5°C, 25 h	
		Soap liquid resistance		2 % sodium lauryl-benzene sulfonate water solution 40 ± 5°C, 24 h	
		Chlorine series bleaching agent resistance		0.2 % sodium hypochlorite water solution 40 ± 5°C, 168 h	

Application	Item	Test	Performance	Main test conditions	Applicable test item
Protective film coating	Flame retardant property	Flame retardant property	Continuing time of flame 5 s max.	Heating for 5 s	10.3.13
	Cooling heating resistance	Cooling heating cycle	To be free from cracks, exfoliation, corrosion of tube, and other abnormalities.	180° bending (70° C, for 2 h) → (ordinary temperature 30 min min.) → (-5° C, 2 h) → (ordinary temperature, 30 min min.) 5 cycles	10.3.14
	Weather resistance	Weathering	To be free from cracks, exfoliation, and other abnormalities.	Sunshine carbon arc irradiation, 400 h	10.3.15
Hose-end connecting metal fitting	Ordinary temperature resistance	Tension	To be free from drawing out of hose end	980 N {100 kgf} tension, for 5 min	10.3.16
	High, low temperatures	Tension	To be free from drawing out of hose end	60° C and -5° C 637 N {65 kgf} tension, for 5 min	