

JAPANESE INDUSTRIAL STANDARD

Ⓔ JIS B2401-1991

O-rings

1995.4

ERRATA

Page	Position	Wrong	Correct
17	Title, line 1	Table 3.	Attached Table 3.
17	Basic dimension, in column of Inside diameter d_1 in Attached Table3.	475.6	475.0

Remarks : This errata is for correcting the first edition of this Standard.

Japanese Standards Association

JIS

JAPANESE INDUSTRIAL STANDARD

O - rings

☞ JIS B 2401—1991

Translated and Published

by

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



1. Scope

This Japanese Industrial Standard specifies O-rings to be used for general apparatuses, hereafter referred to as O-rings.

Remarks 1. The applicable standards to this Standard are as given in the following:

JIS G 3101-Rolled Steel for General Structure

JIS G 4305-Cold Rolled Stainless Steel Plates and Sheets

JIS H 3100-Copper and Copper Alloy-Sheets, Plates and Strips

JIS K 6301-Physical Testing Methods for Vulcanized Rubber

JIS K 8001-General Rules of Testing Methods for Reagents

2. The corresponding International Standard to this Standard is as given in the following:

ISO 3601-1 Fluid systems-Sealing devices-O-rings-Part 1:
Inside diameters, cross-sections, tolerances and
size identification code

3. Units and numerical values given in { } in this Standard are in accordance with the traditional units, and are appended for informative reference.

2. Types

The types of the O-rings shall be as given in Table 1 according to materials and uses.

Table 1

Type		Symbol of material and use	Remark	Informative reference
Division by material	Class 1 A	1 A	For mineral oil resistant use and having spring hardness of Hs 70	Equivalent to nitrile rubber
	Class 1 B	1 B	For mineral oil resistant use and having spring hardness of Hs 90	Equivalent to nitrile rubber
	Class 2	2	For gasoline resistant	Equivalent to nitrile rubber

Table 1. (Continued)

Type		Symbol of material and use	Remark	Informative reference
Division by material	Class 3	3	For animal and vegetable resistant use	Equivalent to styrene-butadiene rubber or ethylene propylene rubber
	Class 4 C	4 C	For thermal resistant use	Equivalent to silicone rubber
	Class 4 D	4 D	For thermal resistant use	Equivalent to fluororubber
Division by use	For moving (packing)	P	—	—
	For fixing (gasket)	G		
	For vacuum flange use	V		
ISO for general industry		1 A	For mineral oil resistant use and having spring hardness of Hs 70, and to type of division by material Class 1 A applies, and shape and dimensions shall conform to ISO 3601-1.	Equivalent to nitrile rubber

3. Physical Properties of Products

When the O-ring for moving (nominal number P26) has been tested in accordance with the specifications of 8.1.1, the results shall conform to the physical properties of Table 2.

Table 2

Test item	Class of material					
	Class 1A	Class 1B	Class 2	Class 3	Class 4C	Class 4D
Tensile strength Min. MPa {kgf/cm ² }	7.8 {80}	11.7 {120}	7.8 {80}	7.8 {80}	3.4 {35}	7.8 {80}
Elongation (%) Min.	200	80	160	120	50	160
Tensile stress MPa {kgf/cm ² } (at 100 % elongation) Min.	2.7 {28}	—	2.7 {28}	2.7 {28}	—	1.9 {20}

4. Fatigue

In the case where O-rings have been tested in accordance with the specifications of 8.1.2, no cracking, peeling, wearing and other defects shall take place. However, this rule does not apply to O-rings of Class 1 B and Class 4.

5. Shapes and Dimensions

The shapes and dimensions of the O-rings shall be in accordance with Table 3.

Table 3

Type	Shapes and dimensions
O-rings for moving	Attached Table 1
O-rings for fixing	Attached Table 2
O-rings for vacuum flange	Attached Table 3
O-rings for ISO system	Attached Table 4

6. Appearance

The surface of the O-ring shall be free from injurious flaws, unevenness, etc. on functions

Furthermore, the burrs of the O-ring shall not have been cut off so as to affect adversely to the functions.

7. Material

The material used shall be synthetic rubber, natural rubber or synthetic resin, and in the case where tested in accordance with the specifications of 8.2, the results shall conform to the physical properties of Table 4, and shall be that having uniformity.

In addition, it shall not contain such material which contaminates the liquid and gas for preventing the leakage and that corrodes metals and causes sticking in contact with the O-ring.

Table 4

Test item		Class of material						Testing method
		1 A	1 B	2	3	4 C	4 D	
Normal condition	Spring hardness (Hs) (¹)	70 ± 5	90 ± 5	70 ± 5	70 ± 5	70 ± 5	70 ± 5	See 8.2.1
	Tensile strength MPa {kgf/cm²} Min.	9.8 {100}	14 {150}	9.8 {100}	9.8 {100}	3.4 {35}	9.8 {100}	
	Elongation (%) Min.	250	100	200	150	60	200	
	Tensile stress MPa {kgf/cm²} Min. (at 100 % elongation)	2.7 {28}	—	2.7 {28}	2.7 {28}	—	1.9 {20}	
Aging test	Temperature and time	120°C, 70 h	120°C, 70 h	100°C, 70 h	100°C, 70 h	230°C, 24 h	230°C, 24 h	See 8.2.2
	Change in spring hardness Hs (¹) Max.	+ 10	+ 10	+ 10	+ 10	+ 10	+ 5	
	Change rate of tensile strength (%) Max.	- 15	- 25	- 15	- 15	- 10	- 10	
	Change rate of elongation (%) Max.	- 45	- 55	- 40	- 45	- 25	- 25	
Compression permanent set test	Temperature and time	120°C, 70 h	120°C, 70 h	100°C, 70 h	100°C, 70 h	175°C, 22 h	175°C, 22 h	See 8.2.3
	Compression permanent set (%) Max.	40	40	25	25	30	40	

Table 4. (Continued)

Test item	Class of material						Testing method
	1 A	1 B	2	3	4 C	4 D	
Oil resist- ance test	Temperature, time and testing oil	120°C, 70 h Lubricating oil No. 1	120°C, 70 h Lubricating oil No. 1	23°C, 70 h Fuel oil No. 1	100°C, 70 h Brake liquid	175°C, 70 h Lubricating oil No. 1	175°C, 70 h Lubricating oil No. 1
	Change in spring hardness Hs(¹)	- 5 to + 8	- 5 to + 8	- 8 to 0	- 15 to 0	- 10 to + 5	- 10 to + 5
	Change rate of tensile strength (%) Max.	- 15	- 20	- 15	- 40	- 20	- 20
	Change rate of elongation (%) Max.	- 40	- 40	- 25	- 40	- 20	- 20
	Change rate of volume (%)	- 8 to + 5	- 8 to + 5	- 3 to + 5	0 to + 12	0 to + 10	- 5 to + 5
	Temperature, time and testing oil	120°C, 70 h Lubricating oil No. 3	120°C, 70 h Lubricating oil No. 3	23°C, 70 h Fuel oil No. 2	-	-	175°C, 70 h Lubricating oil No. 3
	Change in spring hardness Hs(¹)	- 15 to 0	- 10 to + 5	- 20 to 0	-	-	- 10 to + 5
	Change rate of tensile strength (%) Max.	- 25	- 35	- 45	-	-	- 20
	Change rate of elongation (%) Max.	- 35	- 35	- 45	-	-	- 20
	Change rate of volume (%)	0 to + 20	0 to + 20	0 to + 30	-	-	- 5 to + 5

See 8.2.4

Table 4. (Continued)

Test item		Class of material					Testing method
		1 A	1B	2	3	4 C	
Low temperature bending test	Temperature and time	- 30 to - 35°C, 5 h					See 8.2.5
	Appearance	At first, 2 pieces are tested and none shall produce crack. However, when one piece produces cracks, 2 pieces made of the same plate material are tested, and both two shall produce no crack.					
Corrosion and stick test	Temperature and time	70 ± 1°C, 24 h					See 8.2.6
	Appearance	It shall not corrode or produce stickiness on the object metal. However change in color on the metal surface shall not be considered as corrosion.					

Note (1) The sping harness shall employ the type A (JIS A) of 5.2.2 of JIS K 6301.