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JAPANESE INDUSTRIAL STANDARD

**Automotive parts — Reservoir
seals for hydraulic brake
master cylinders using a
non-petroleum base
hydraulic brake fluid**

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Automotive parts — Reservoir seals for
hydraulic brake master cylinders
using a non-petroleum base hydraulic brake fluid

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1. Scope This Japanese Industrial Standard specifies the reservoir rubber seal (hereafter referred to as "reservoir seal") assembled to the connecting part of cylinder body and reservoir of the hydraulic brake master cylinder for automobile that uses non-petroleum base brake fluid for the purpose of preventing the leakage of fluid and the intrusion of foreign material, water, etc. into inside.

Remarks: The following standards are cited in this Standard:

- JIS D 2605 Rubber cups for hydraulic cylinders for automotive hydraulic brake systems using a non-petroleum base hydraulic brake fluid
- JIS K 2233 Non-petroleum base motor vehicle brake fluids
- JIS K 2503 Testing method of lubricating oil for aircraft
- JIS K 6253 Hardness testing methods for vulcanized rubber
- JIS K 6257 Accelerated aging test methods for vulcanized rubber
- JIS K 6259 Testing methods of resistance to ozone cracking for vulcanized rubber
- JIS K 6262 Permanent set testing methods for vulcanized rubber
- JIS Z 8401 Rules for rounding off of numerical values

2. Classification The reservoir seal is divided as shown in Table 1.

Table 1. Classification of reservoir seal

Classification	Division
Type 1	Usable under the usual working condition
Type 2	Usable under the working condition of high temperature
Type 3	Usable under the working condition of specially high temperature

3. Quality

3.1 Appearance The surface of reservoir seal shall be of good finish and be free from harmful bubble, flaw, burr, foreign materials, etc.

3.2 Performance The performance of reservoir seal shall be tested in accordance with 4. and be in conformance with Table 2.

Table 2. Performance of reservoir seal

Item		Classification			Test method
		Type 1	Type 2	Type 3	
Ordinary state	Hardness	60 ± 5, 65 ± 5 or 70 ± 5			In accordance with 4.1 Ordinary state test.
Aging resistance	Temperature and time ⁽¹⁾	70 ± 1°C, 120 ± 2 h	120 ± 2°C, 70 ± 1 h	150 ± 2°C, 70 ± 1 h	In accordance with 4.2 Aging resistance test.
	Hardness change	- 5 to + 5			
	State	There shall not be extreme adhesion and abnormality of appearance.			
Fluid resistance	Temperature and time ⁽¹⁾	70 ± 1°C, 120 ± 2 h	120 ± 2°C, 70 ± 1 h	150 ± 2°C, 70 ± 1 h	In accordance with 4.3 Fluid resistance test.
	Percentage of volume change	0 to 15	0 to 20		
	Hardness change	- 10 to 0	- 15 to 0		
	State	There shall not be extreme adhesion and abnormality of appearance.			
Low temperature bending	Temperature and time ⁽¹⁾	- 40 ± 2°C, 22 ± 1 h			In accordance with 4.4 Low temperature bending test.
	State	There shall not be the generation of crack and reservoir seal shall return approximately to the original shape within 1 min.			
Low temperature leakage resistance	Temperature and time ⁽¹⁾	- 40 ± 2°C, 70 ± 1 h			In accordance with 4.5 Low temperature leakage resistance test.
	State	There shall not be fluid leakage.			
Airtightness	Pressure and time ⁽¹⁾	The airtightness shall be maintained for 1 min at the hydraulic pressure 410 kPa to 450 kPa.			In accordance with 4.6 Airtightness test.
	State	The fluid leakage shall be not more than 1 mL.			

Table 2. (continued)

Item		Classification			Test method
		Type 1	Type 2	Type 3	
Cooling and heating repeatability	Temperature and time ⁽¹⁾	65 ± 3°C, 90 ± 1 h 37 ± 3°C, 50 ± 1 h – 20 ± 3°C, 10 ± 1 h – 40 ± 3°C, 5 ± 1 h 70 ± 3°C, 15 ± 1 h (total 170 h)	65 ± 3°C, 70 ± 1 h 100 ± 3°C, 20 ± 1 h 37 ± 3°C, 50 ± 1 h – 20 ± 3°C, 10 ± 1 h – 40 ± 3°C, 5 ± 1 h 120 ± 3°C, 15 ± 1 h (total 170 h)		In accordance with 4.7 Cool and heat repeating test.
	State	After the repeat of cooling and heating, carry out the test in 4.6. The fluid leakage at that time shall be not more than 1 mL.			
	Vibration resistance	Vibration acceleration ⁽¹⁾ m/s ²	40		
Vibration frequency and time ⁽¹⁾		10 Hz to 15 Hz, 4 h			
State		There shall not be fluid leakage.			
Horizontal load resistance	Load position ⁽¹⁾	Proper position of the maximum fluid amount level of reservoir or its vicinity			In accordance with 4.9 Horizontal load test.
	Load ⁽¹⁾	N			
	State	There shall not be fluid leakage.			
Compression permanent strain	Temperature and time ⁽¹⁾	70 ± 1°C, 22 ± 1 h	120 ± 2°C, 22 ± 1 h	150 ± 2°C, 22 ± 1 h	In accordance with 4.10 Compression permanent strain test.
	Compression permanent strain %	30 max.			

Table 2. (continued)

Item		Classification			Test method
		Type 1	Type 2	Type 3	
Precipitation	Temperature and time (1)	70 ± 1°C, 120 ± 2 h	120 ± 2°C, 70 ± 1 h	150 ± 2°C, 70 ± 1 h	In accordance with 4.11 Precipitation test.
	Amount of precipitate	0.3 max.			
	Ozone resistance	Ozone concentration (1)	50 ± 5		
Temperature and time (1)		40 ± 2°C, 70 ± 1 h			
Elongation (static) (1)%		15 ⁰ ₋₃			
State		Crack capable of being confirmed with a magnifying glass of two magnifications shall not be generated.			

Note ⁽¹⁾ The test conditions specified in 4 are shown for informative reference.