



SURFACE VEHICLE STANDARD	J1603	DEC2014
	Issued	1974-04
	Stabilized	2014-12
Superseding J1603 MAY2008		
Rubber Seals for Hydraulic Disc Brake Cylinders		

RATIONALE

Technology is considered stable. Committee strategy is to update the duty cycles of component durability tests with the outcome of the J2995 project. Test fixturing and methodology is not expected to change.

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1. SCOPE

This SAE Standard describes the performance and part requirements for elastomeric seals used in highway vehicle disc brake calipers. Seals covered by this specification may be the solid section type (square, rectangular, O-ring, etc.) mounted stationary in the cylinder bore or on the movable piston. The specification contains the following major sections:

- a. Resistance to Fluid at Elevated Temperature—Physical Stability [loose parts in $120\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ ($248\text{ }^{\circ}\text{F} \pm 3.6\text{ }^{\circ}\text{F}$) brake fluid for 70 h]
- b. Resistance to Fluid at Elevated Temperature—Precipitation Characteristics [loose parts in $120\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ ($248\text{ }^{\circ}\text{F} \pm 3.6\text{ }^{\circ}\text{F}$) brake fluid for 70 h]
- c. Resistance to Elevated Temperatures in Dry Air [loose parts in $175\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ ($347\text{ }^{\circ}\text{F} \pm 3.6\text{ }^{\circ}\text{F}$) air for 22 h]
- d. Ambient Temperature Stroking Test [tested in brake assembly for 500 000 cycles to $7\text{ MPa} \pm 0.3\text{ MPa}$ ($1000\text{ psi} \pm 50\text{ psi}$)]
- e. High Temperature Stroking Test [tested in brake assembly for 70 h (70 000 strokes) at $120\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ ($248\text{ }^{\circ}\text{F} \pm 3.6\text{ }^{\circ}\text{F}$) to $7\text{ MPa} \pm 0.3\text{ MPa}$ ($1000\text{ psi} \pm 50\text{ psi}$)]
- f. Low Temperature Leakage Test [tested in brake assembly for 120 h at -40 to $-43\text{ }^{\circ}\text{C}$ (-40 to $-45.4\text{ }^{\circ}\text{F}$)]
- g. Cycling Humidity Storage Corrosion Test [tested in brake assembly for 14 days at 95% humidity cycling between 21 to $46\text{ }^{\circ}\text{C}$ (69.8 to $114.8\text{ }^{\circ}\text{F}$)]

2. REFERENCES

2.1 Applicable Publications

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply.

2.1.1 SAE Publication

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

SAE J1703 Motor Vehicle Brake Fluid

SAE J1704 Borate Ester Based Brake Fluids

2.1.2 ASTM Publication

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM D 573 Standard Test for Rubber—Deterioration in an Air Oven

3. PARTS REQUIREMENTS

3.1 Parts shall conform to the pertinent drawing in all respects.

3.2 Manufacturer's identification, when used, shall be that on record at the Rubber Manufacturers Association.

3.3 All parts to be tested shall be cleaned prior to testing by rinsing in isopropyl alcohol and blown dry or wiped dry with a lint-free cloth. Seals shall not remain in alcohol for more than 30 s.

4. BRAKE TEST FLUID

Fluid for all test phases except 7 (see 7.7) shall be the Compatibility Fluid specified in the latest revision of SAE J1703 or SAE J1704, Appendix B, or a mutually agreed upon commercial fluid. Fluid used in test 7 shall be SAE Compatibility Fluid or a mutually agreed upon commercial preservative type fluid.

5. TEST EQUIPMENT

Equipment used for testing shall be as shown in Figures 1 and 2.

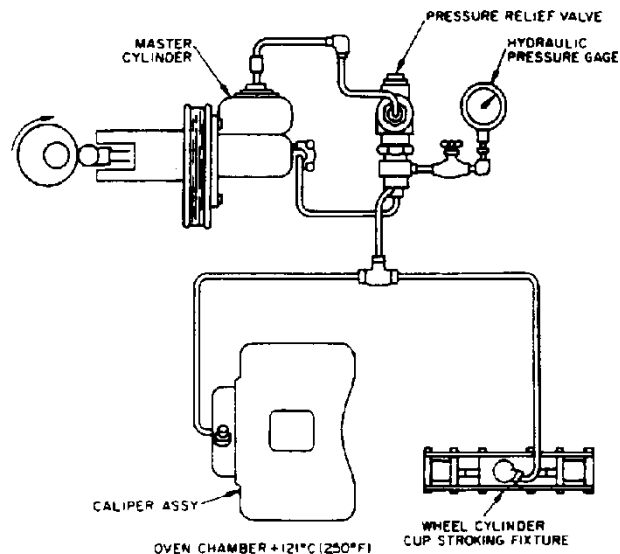


FIGURE 1 - HIGH TEMPERATURE STROKING TEST