Hydraulic Valves for Motor Vehicle Brake Systems—Performance Requirements —SAE J1137

SAE Recommended Practice
Approved May 1977

THIS IS A PREPRINT AND WILL APPEAR IN THE NEXT EDITION OF THE SAE HANDBOOK

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HYDRAULIC VALVES FOR MOTOR VEHICLE BRAKE SYSTEMS—PERFORMANCE REQUIREMENTS—SAE J1137

SAE Recommended Practice

Report of Hydraulic Brake Systems Actuating Committee approved May 1977.

1. General—This Recommended Practice applies to valve assemblies used in hydraulically operated brake systems of highway vehicles. It covers such valves where they are employed in passenger car and light truck brake systems utilizing motor vehicle non-petroleum hydraulic brake fluids per SAE J1702 and J1703. This Recommended Practice is applicable for differential warning, hold-off, or proportioning type valves or any combination thereof.

2. Scope—The Recommended Practice specifies minimum performance and durability requirements for satisfactory vehicle usage, and it is applicable to new valve assemblies from commerical production and re-manu facture (factory rebuild).

3. Requirements—Valve assemblies shall, when tested in accordance with the test procedures outlined in SAE J1118, Hydraulic Valves for Motor Vehicle Brake Systems—Test Procedure, meet the following requirements:

3.1 Ozone Resistance of External Elastomeric Boots or Seals

3.1.1 Per test procedure 5.1.1 of SAE J1118, the boot(s) or seals shall not be perforated or cracked through in any areas.

3.2 Compensation and Reverse Flow for Both Front and Rear Brake Systems

3.2.1 Per test procedure 5.2.1, 5.2.2, 5.2.3, and 5.2.4 of SAE J1118, the minimum flow rate shall not be less than 3 cm^3/min.

3.2.2 Per test procedure 5.2.5 and 5.2.6 of SAE J1118, the minimum flow rate shall not be less than 300 cm^3/min.

3.3 Pressure Leak Test

3.3.1 Low Pressure Leak Test—Front and Rear Brake Systems—Per test procedure 5.3.1 of SAE J1118, there shall be no drop in pressure in excess of 14 kPa (2 psi) in 30 s interval.

3.3.2 High Pressure Leak Test—Front and Rear Brake Systems—Per test procedure 5.3.2 of SAE J1118, there shall be no drop in pressure in excess of 345 kPa (50 psi) in 30 s interval.

3.4 Functional Characteristics

3.4.1 Differential Warning Actuation

3.4.1.1 Per test procedure 5.4.1.1 of SAE J1118, there shall be no drop in pressure in excess of 690 kPa (100 psi) in 30 s interval. Resistance of switch terminal to body must exceed 10 000 Ω.

3.4.1.2 Per test procedure 5.4.1.2 of SAE J1118, pressure to shuttle differential piston shall be within requirements specified by the vehicle manufacturer. Switch contact shall be established by an indicating light.

3.4.1.3 Per test procedure 5.4.1.3 of SAE J1118, pressure to re-center differential piston when switch turns off indicating light, where applicable, shall be within requirements specified by the vehicle manufacturer.

3.4.1.4 Per test procedure 5.4.1.4 of SAE J1118, see requirements 3.4.1.2.

3.4.1.5 Per test procedure 5.4.1.5 of SAE J1118, see requirements 3.4.1.3.

3.4.2 Hold-Off Valve Test—Per test procedure 5.4.2 of SAE J1118, hold-off section shall functionally comply with requirements specified by the vehicle manufacturer.

3.4.3 Proportioning Valve Test—Per test procedure 5.4.3 of SAE J1118, proportioning section and applicable by-pass feature shall functionally comply with requirements specified by the vehicle manufacturer.

3.5 Physical Strength Test—Per test procedure 5.5 of SAE J1118, the gage shall show no abrupt pressure drop and no leakage of brake fluid in excess of one drop per sealing point, nor shall the valve assembly show any signs of mechanical failure.

3.6 High Temperature Durability

3.6.1 Per test procedure 5.6.1 of SAE J1118, output pressure shall indicate the valve components are functioning. Shuttling of the differential piston during stroking tests, which results in the switch closing (contact), shall constitute a failure.

3.6.2 Per test procedure 5.6.2 of SAE J1118, leakage of brake fluid at each sealing point shall not exceed two drops.

3.6.3 Per test procedure 5.6.3 of SAE J1118, there shall be no leakage of brake fluid in excess of two drops per sealing point.

3.6.4 Per test procedure 5.6.4 of SAE J1118, see requirements 3.3.1 and 3.3.2.

3.7 Cold Temperature Operation

3.7.1 Per test procedure 5.7.1 of SAE J1118, there shall be no leakage of brake fluid in excess of two drops per sealing point.

3.7.2 Per test procedure 5.7.2 and 5.7.3 of SAE J1118, pressure drop must not exceed 69 kPa (10 psi) on 5.7.2 and 345 kPa (50 psi) on test procedure 5.7.3 of SAE J1118 and/or two drops per sealing point. Shuttling of the differential piston which results in the switch closing (contact) shall constitute a failure.

3.7.3 Per test procedure 5.7.4 and 5.7.8 of SAE J1118, pressure to shuttle differential piston shall not vary more than 100% from the normal original room temperature requirements as specified by the vehicle manufacturer. Switch contact must be established.

3.7.4 Per test procedure 5.7.5 and 5.7.6 of SAE J1118, see requirements 3.7.2.

3.7.5 Per test procedure 5.7.7 of SAE J1118, piston must re-center where applicable and light go out.

3.7.6 Per test procedure 5.7.9 of SAE J1118, see requirements 3.7.3 and 3.7.5.

3.8 Static Leak Test

3.8.1 Per test procedure 5.8.1 of SAE J1118, there shall be no leakage of brake fluid in excess of one drop per sealing point.

3.8.2 Per test procedure 5.8.2 of SAE J1118, ± 25% of functional requirements of 3.4.

3.9 Examination—Because these specifications spell out only minimum requirements, none are specified for procedure 5.9 of SAE J1118.