SURFACE VEHICLE RECOMMENDED PRACTICE

J1707™ JUN2021

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Superseding J1707 SEP2016

Service Maintenance of SAE J1703 and SAE J1704 Brake Fluids in Motor Vehicle Brake Systems

RATIONALE

This limited scope revision includes updating the title of SAE J1704 in the reference section.

1. SCOPE

This SAE Recommended Practice provides basic recommendations for dispensing and handling of SAE J1703 and SAE J1704 Brake Fluids by Service Maintenance Personnel to assure their safe and effective performance when installed in or added to motor vehicle hydraulic brake actuating systems.

This document is concerned only with brake fluid and those system parts in contact with it. It describes general maintenance procedures that constitute good practice and that should be employed to help assure a properly functioning brake system. Recommendations that promote safety are emphasized. Specific step-by-step service instructions for brake maintenance on individual makes or models are neither intended nor implied. For these, one should consult the vehicle manufacturer's service brake maintenance procedures for the particular vehicle. Vehicle manufacturer's recommendations should always be followed.

2. REFERENCE

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, 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 +1 724-776-4970 (outside USA), www.sae.org.

SAE J1703 Motor Vehicle Brake Fluid

SAE J1704 Motor Vehicle Brake Fluid Based Upon Glycols, Glycol Ethers, and the Corresponding Borates

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3. MOTOR VEHICLE BRAKE FLUID REQUIREMENTS

3.1 SAE Motor Vehicle Brake Fluid

SAE J1703 and SAE J1704—These specifications cover motor vehicle brake fluids of the nonpetroleum type for use in the braking system of any motor vehicle, such as a passenger car, truck, bus, trailer or motorcycle. These fluids are not intended for use under arctic conditions.

3.2 Performance Requirements of Motor Vehicle Brake Fluids

While minimum anticipated atmospheric temperatures can generally be estimated, maximum operational brake fluid temperatures are a function of brake system design, service maintenance practices, variations in driving habits, and other factors which are difficult to evaluate. The motor vehicle manufacturer is best qualified to recommend the brake fluid type required in a specific motor vehicle brake actuating system. Whenever the vehicle manufacturer clearly specifies or otherwise indicates the brake fluid required, service maintenance personnel should use the brake fluid recommended by the vehicle manufacturer.

3.3 Effect of Contaminants Upon the Performance of Motor Vehicle Brake Fluids

Commercial brake fluids are susceptible to various types of contamination which can be detrimental to the performance and safety of brake actuating systems.

3.3.1 Contamination with Petroleum Products

Due to the color and visual appearance of motor vehicle brake fluids, accidental or inadvertent contamination with petroleum products as engine or transmission oils, petroleum distillates, cleaning solvents or fabric cleaners can occur, unless specific precautions are taken to prevent this type of contamination. Even very small contamination levels of brake fluids with petroleum products which are not visible may be detrimental to the rubber seals of a brake system. Only if higher concentrations are present, a contamination with petroleum type contaminants will become obvious by causing a visual cloudiness or opaque appearance of the brake fluid.

“Hydraulic brake fluid” can be confused with service products identified as “hydraulic fluid,” which may be a petroleum or a synthetic fluid having different chemical and physical properties and which are not intended for use in a motor vehicle brake system.

NOTE: Never use hydraulic fluids or oils in place of brake fluid.

Petroleum products are rapidly and selectively absorbed by brake system rubber parts, resulting in a high degree of softening, dimensional swelling, and general deterioration of the functional properties of these rubber parts. This type of brake fluid contamination will result in unsafe braking action, and may be the direct cause of complete brake failure.

Do not use a brake fluid that is cloudy, opaque, an emulsion, separated into layers, or that contains drops of liquid. If petroleum contamination is suspected, dispose of fluid in accordance with all applicable laws and regulations.

In case a brake system is proven to have been severely contaminated with a mineral oil product, safe operation can only be regained by changing any component which has come into contact with the contaminant.

3.3.2 Contamination with Miscellaneous Automotive Products

Many types of liquid automotive specialty products, solvents, and cleaners are used in service stations, garages, and other establishments where brake service or maintenance is performed. Contamination of motor vehicle brake fluid with any such products will result in a deterioration of many essential performance requirements of the brake fluids, causing improper brake action or actual brake failure.

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3.3.3 Water Contamination

SAE J1703 and SAE J1704 motor vehicle brake fluids are hygroscopic and absorb moisture when exposed to the atmosphere and in service. Water contamination from any source including mechanical or accidental additions of free water, will appreciably lower the original boiling point of the brake fluid with the possible consequence of brake failure because of gas bubble formation in hot brake components. As a further consequence of water absorption, the fluid´s viscosity will be increased at low ambient temperatures, adversely affecting the functionality of various features of hydraulic modulators. Water contamination may cause corrosion of brake cylinder bores and pistons, and may seriously affect the braking efficiency and safety of the brake actuating system.

3.3.4 Contamination with Dirt or Dust

Dirt, moisture, and petroleum contaminants can enter the brake system from failure to clean the brake fluid reservoir cap before removing it to check the fluid level, or from careless handling of brake fluid or brake system parts in performing other maintenance or service operations. Dust, as well as moisture, can enter the brake system through damaged or improper cylinder boots or gasket seals.

Dirt and dust are abrasive and will score or scratch wheel cylinder seals and bores, resulting in fluid leakage or other operational problems which affect the braking efficiency and the safety of the motor vehicle brake system. Additionally, particles of a size capable to cause a leakage of various seals and hydraulic valves within the brake system may lead to a brake failure directly.

3.3.5 Mixing Motor Vehicle Brake Fluids

The mixing of different SAE J1703 and SAE J1704 brake fluids will not adversely affect the brake actuating system, but it may adversely affect the resulting properties of the mixture. It is not recommended to use intended mixtures of different brake fluids types or brands, but residues of one type remaining in the brake system are no obstacle to operate the system with another type.

4. RECOMMENDED SERVICE INSTRUCTIONS FOR HANDLING AND DISPENSING BRAKE FLUID

4.1 Storage of Motor Vehicle Brake Fluid

Store brake fluid in a dry place at or not far away from room temperature and separate this storage area from similar storage of petroleum products, automotive specialty products, or any fluid materials used for shop maintenance purposes.

Large capacity drum type containers require transfer of brake fluid to some intermediate dispensing container. This type of handling tends to promote or cause contamination. It is recommended that brake fluid be purchased and stocked in container sizes that permit direct transfer of brake fluid from the container to the brake system, if no commercially available dispensing device designed for brake fluid transfer is used. It is strongly recommended that containers for direct transfer from the container to the vehicle brake fluid reservoir do not exceed 1 gal in capacity. Brake fluid stock should be rotated to prevent extended storage periods. For servicing the motor vehicle brake system, use only brake fluid of that type, vehicle manufacturer standard or part number that is recommended by the vehicle manufacturer and conforms to SAE and DOT standards.

4.2 Dispensing Equipment

Due to the increased possibility of contamination of the brake fluid, the use of auxiliary dispensing equipment besides commercially available devices designed for dispensing brake fluid should be avoided. When commercial dispensing equipment is used for adding brake fluid to the motor vehicle brake system such equipment must be assigned for use only with brake fluids, must be clean, and must be mechanically designed to eliminate any possibility of contamination of the brake fluid with dirt, petroleum lubricants, or moisture from condensation or exposure to the atmosphere. Any new dispensing equipment should be flushed with the brake fluid and the fluid examined for contamination before placing the unit in service. When a pressure bleeder tank is used, it must be designed to prevent any possible aeration of the brake fluid. Normally, air pressure is applied to the fluid by a mechanism which employs a rubber diaphragm. It is important that the compressed air supply be clean and dry. Many rubber compounds are quite permeable to both air and moisture. Butyl rubber diaphragms have been found superior for this application and should be used.

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