Brake Fluid

1. Specifications

Viscosity

The brake fluid must have a suitable viscosity throughout the operating temperature range. Brake fluid temperature may rise as high as 300°F (150°C) during heavy usage. In colder regions the brakes are expected to operate at -25°F (-30°C) or lower.

Even at those temperatures the brake fluid must operate the piston and lubricate internal moving parts.

Boiling Point

When the brakes are applied, the braking surfaces may be as hot as 500°-650°F (250°-350° C) although a part of this is radiated before it reaches the fluid. While the brakes are being applied the fluid will not boil because of the 300-600 lbs/sq.in. (20-40 kg/cm2) pressure in the line. As soon as the brake lever is released, however, the effects of the temperature are felt and a fluid with a low boiling point will turn to gas and cause a vapor lock in the brake line.

Care must be taken that no moisture is absorbed into the fluid, or introduced into the fluid through the reservoir since this will lower the boiling point.

Ignition Point

The brake fluid should have a high ignition point to minimize the possibility of fire in the event of brake line leakage.

A fluid with a high boiling point can be expected to have a high ignition point.

Non-Corrosive

The brake fluid must not have a corrosive or deleterious effect on either the metal or rubber parts of the brake mechanism. If the fluid deteriorates or swells the rubber, corrodes metal parts or causes the formation of sludge, it is not suitable for use in disc brakes.

2. Changing the Brake Fluid

Change the brake fluid completely –

(a) After one year or 6,000 miles (10,000 km)
(b) If water or moisture becomes mixed with the fluid.
(c) When the fluid appears dirty or cloudy.

CAUTION:

1. **Never re-use old brake fluid.**
2. **Do not mix two types of fluid for use in the brakes. This lowers the brake fluid boiling point and could cause the brake to be ineffective.**
3. **Don't leave the reservoir cap off for any length of time as moisture may be absorbed into the fluid.**
4. **Don't change the fluid in the rain, or when a strong wind is blowing.**

To change the fluid:

- Attach a hose to the bleeder valve, inserting the other end of the hose into a container.
- Open the bleeder valve and pump the brake lever until all the fluid is drained and only air comes out of the hose.
- Fill the reservoir with new brake fluid and pump the brake lever until the brake line is completely filled with fluid, and no more air bubbles come out of the hose. Do not let the fluid in the reservoir run out at any time during this operation.
- Close the bleeder valve and fill the reservoir up to the line.
- Check that the lever pulls hard.

Master Cylinder

- Check that there are no scratches, rust or pitting on the inside of the master cylinder, and that it is not unduly worn.
- Check the piston for these same faults.
- Inspect the primary and secondary cups. If a cup is worn, damaged or softened (rotted), or swollen, replace it. When inserting the cup into the cylinder see that it is slightly larger than the cylinder (standard values given in the table). If oil leakage is noted at the brake lever, the cups should be replaced. (The secondary cup is part of the piston assembly).
- Check that the spring is not damaged and is not shorter than the service limit.
- Inspect all other rubber parts and replace any that are worn, damaged, etc.

Table 35 Master Cylinder Parts

Measurement	Standard	Service Limit
Cylinder inside diameter	.5512-.5529 inch (14.000-14.043 mm)	.5543 inch (14.080 mm)
Piston outside diameter	.5495-.5506 inch (13.957-13.984 mm)	.5496 inch (13.960 mm)
Primary, secondary cup diameter	.577-.596 inch (14.65-15.15 mm)	.571 inch - (14.50 mm)
Spring length (free)	2.01 inch (51 mm)	1.89 inch (48 mm)