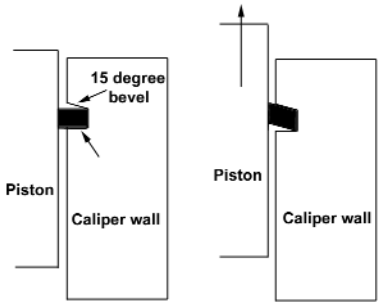
LOW OR EXCESSIVE PEDAL TRAVEL CAUSED BY THE LOW DRAG CALIPER

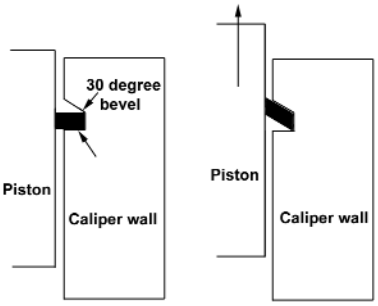
What is a low drag caliper?

In 1980 GM introduced the low drag caliper on its vehicles. The reason for the low drag caliper was the energy crisis. Low drag calipers were designed to reduce the rolling resistance of their vehicles thereby giving you better gas mileage. This rolling resistance is produced by the friction generated by the pads rubbing against the rotor when the brakes are not applied.

The engineering people at GM found that a change in the square cut seal groove on the caliper could cause the caliper piston to be pulled back twice as much as the conventional caliper. The low drag caliper uses a 30 degree bevel in the seal groove as opposed to the conventional calipers' 15 degree bevel. Twice the bevel causes twice the seal flex. Flexing the seal twice as much pulls the caliper piston back into the caliper bore twice as far...hence no drag with the low drag caliper.



The conventional caliper produces a given amount of distortion which pulls the caliper piston back into the caliper bore only slightly



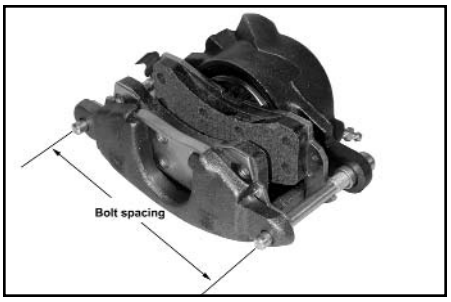
The low drag caliper flexes twice as much and pulls the caliper piston back into the bore twice as much.

Whats the problem with using a low drag caliper?

A conventional master cylinder will not work with a low drag caliper. The volume of fluid needed to take up the extra gap created by the low drag caliper exceeds the conventional master cylinder's capacity. To fix this problem GM designed whats called a quick take up master. These cylinders are of a stepped bore design. They provide a large volume of fluid initially to take up the gap and then complicated internal valving switches the master over to a high pressure system where it acts as a conventional master cylinder. If you don't use a quick take up master with low drag calipers you will never get a good pedal

How do you visually check if your calipers are low drag?

Unfortunately low drag calipers are mixed in throughout the system with conventional calipers, especially if rebuilt calipers are used. Externally there's no way to tell. One helpful hint is that the majority of low drag calipers were of the smaller GM design with a caliper mounting bolt spacing of 5-1/2" as opposed to the large GM caliper with a 7" bolt spacing.



How do you physically check if your calipers are low drag?

To check if your caliper is low drag perform the following test. Obtain a pair of brake hose clamps at an auto parts store. Try the pedal as it is and then clamp off the two front hoses. If the pedal returns and is high and firm chances are you have low drag calipers. Be aware that this same sympton will occur if there is still air in the caliper or the bleeder screw that lets the air out during bleeding is not directly on top in the 12:00 position facing up.

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Revised 09172003