



LETTER OF THE LAW

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BRAKING SYSTEM UPGRADES OR MODIFICATIONS

Upgrading of braking systems has taken a change in the last 5–10 years with a greater range of aftermarket brake upgrade kits available to suit almost all makes and models of vehicles.

The most common upgrade will usually involve sourcing brake components from the same manufacturer that were available as an option or may not be fitted to base-model vehicles. Replacing brake components on your vehicle with upgraded equipment available as an option for that vehicle is classed as a minor modification that does not require engineering certification.

Major modifications such as upgrading the braking system with any components such as disc rotors, brake calipers, master cylinder or brake booster from another vehicle require engineering certification.

Some of the Australian Design Rules that are most likely to be affected when modifications to a braking system are carried are as follows: ADR 7/ Hydraulic Brake Hoses and ADR 31/ Hydraulic brake systems for passenger cars.

ADR 7/ Hydraulic Brake Hoses specifies the minimum performance requirements for a flexible brake hose to minimise the risk of failure when in service. Some of these tests include an expansion test, bursting strength, whip test, tensile test, salt spray testing and many more. The manufacturer will test hoses to these requirements before a brake hose may be approved for automotive applications. If you are considering replacing any flexible brake hoses with non-standard replacement hoses, (ie, braided hoses), make sure they are approved to ADR 7/.

ADR 31/ Hydraulic Brake Systems for Passenger Cars specifies all the minimum specifications for braking equipment, parking brake equipment, functions of the braking system, characteristics and performance of braking systems. All production vehicles must meet these requirements for a compliance plate approval to be issued.

When considering a brake system upgrade, it is recommended to use existing production components that do not require modification. Some guidelines to consider when modifying a braking system are as follows.

When fitting larger-diameter front disc brake rotors onto a front stub axle assembly, you should not modify, alter or machine the diameter of the front spindle to accommodate fitting the replacement bearing. A more satisfactory method is to select the correct bearing diameter to allow machining of the disc rotor within recommended limits.

Fitting larger brake calipers generally requires adaptor plates to be fabricated to locate the caliper to the stub axle assembly. The adaptor plate should be constructed using steel rather than aluminium and should be a one-piece unit that does not require any welding or heat treatment. Machining of adaptors is accepted provided no sharp edges or cuts are made that will reduce the structural integrity of the adaptor or promote and stress concentrations.

Any replacement fasteners must be, as a minimum, equivalent to the original fasteners fitted by the manufacturer and must incorporate any locking devices such as spring washers, locking nuts or locking pins. Any threaded bosses fitted to brake components must engage the fastener for at least the dimension of no less than 1.5 times the diameter of the fastener.

Replacing the brake booster and master cylinder assembly to the firewall requires adequate strength and a suitably reinforced firewall. The mounting position on the firewall must be able to withstand a recommended load of 1800 Newtons when applied to the brake pedal via the brake pedal mechanism. Any existing openings in the firewall should be sealed to retain structural integrity and prevent debris or fumes entering the cabin.

A replacement brake booster or master cylinder must be carefully selected to provide the correct brake balance or bias between the front and rear wheels. The brake booster must be selected to suit the travel of the pedal and maintain the correct pedal ratio, while the master cylinder must be adequately sized to meet the total volume and displacement of the caliper pistons and slave cylinders.

Any replacement fixed hydraulic brake lines should be constructed using steel bundy tube only and must be double flared using the appropriate flaring tool and then fitted with only approved connections and fittings. All brake lines must be satisfactorily secured to the vehicle in protected areas avoiding debris and other vehicle components.

Operating clearances of brake components are critical and it is therefore recommended to check clearances of wheels, suspension components and other vehicle components.

Upgrading your braking system requires thought and planning. There are many suppliers of aftermarket braking components or complete braking system packages that are ADR approved. If in doubt, consult with specialised brake system technicians and a certified engineer before attempting any braking modifications. *SC*

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