

SECTION 4: BRAKES

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4.1 MINIMUM REQUIREMENTS OF BRAKING SYSTEMS

- 4.1.1 All components of the braking system must be in a serviceable condition. The type and size of the braking system must be at least equal to the braking system of a vehicle of similar size, weight and performance. Hydraulic brakes must be fitted on all wheels.
- 4.1.2 Dual circuit or split systems must be used. These systems may utilise either integral tandem master cylinders or dual individual master cylinders.
- 4.1.3 The street rod's brake must be tested in accordance with the procedures below.
Note: These are the tests specified in Section LG, VSB 14.
- 4.1.3.1 Tests should be conducted on fully laden Street Rods and they should meet the following stopping distances and decelerations outlined in Table 4.1. The tests and performance levels specified in Table LG4 are contained in the AVSR.
- 4.1.3.2 The tests should be conducted on a smooth dry level road surface free from loose material. The Street Rod must not move outside a 3.7 metre wide straight path centred on the longitudinal axis of the Street Rod when the brakes are initially applied.

Brake Type	GVM (tonnes)	Max. stopping distance (m) from 35 km/hr	Min. average deceleration (ms ⁻²) from any speed	Min. peak deceleration (ms ⁻²) from any speed
Service Brakes	Under 2.5 tonnes	12.5	3.8	5.8
	2.5 tonnes and over	16.5	2.8	4.4
Emergency Brakes	Under 2.5 tonnes	30	1.6	1.9
	2.5 tonnes and over	40.5	1.1	1.5

Table 4.1 Minimum Braking Performance Requirements for Street Rods

- 4.1.3.3 The service brakes and emergency brakes must be capable of stopping the Street Rod with one sustained application from a speed of 35 km/hr in no more than the respective distances listed in Table 4.1.
- 4.1.3.4 The service brakes and emergency brakes must also be capable of stopping the Street Rod with one sustained application from any speed at which the Street Rod can travel, at no more than the respective average and peak deceleration rates listed in Table 4.1.
- 4.1.3.5 The braking system must incorporate a parking brake that is applied only by direct mechanical means, can be locked in the applied position, and can be operated from the normal driving position. The parking brake must be capable of holding the Street Rod on a 12% gradient.

i. 4.2 DISC BRAKES

Where disc brakes are fitted to the front axle, they should be of the ventilated type.

ii. 4.3 BRAKE BALANCE

The brake system must provide the correct balance between front and rear to help avoid premature lock up during braking. Whenever possible, the entire braking system of a vehicle of similar size and performance to the Street Rod under construction should be used. Street Rods will often have a mix-and-match brake system due to availability of parts. When this is the case, the builder must ensure that the master cylinder is capable of

delivering the required volume of fluid to each circuit, and that the bore diameter, booster and pedal ratio are matched, without excessive pedal travel. Any mix-and-match proposal should be referred to an Examiner, as documentation for the proposed combination of components may already be held on file.

iii. 4.4 MASTER CYLINDERS

- 4.4.1 Master cylinders must be sized to correct braking to the front and rear wheel at all likely stages of brake wear without excessive travel.
- 4.4.2 Master cylinders must have a displacement volume sufficient to actuate both circuits without excessive pedal travel. Street Rods fitted with four wheel discs or aftermarket discs and callipers must be fitted with a master cylinder that displaces a volume of fluid compatible with the size and number of the calliper pistons.
- 4.4.3 Master cylinders must be securely mounted on either the firewall or the chassis. All mounting bolts or studs provided for by the component manufacturer must be used to secure the master cylinder and booster. Flexing of brake component mountings may reduce the effectiveness of the brakes during an emergency stop and must be kept to a minimum.

iv. 4.5 BOOSTING

Boosters should be used. If a brake booster is not fitted a brake certificate certifying compliance to VSB 14, Section LG may be required.

v. 4.6 BRAKE PEDALS

- 4.6.1 There should be no distortion or flex in the brake pedal, the pedal box or mounting brackets, or the bulkhead when the brake pedal is depressed. Any flex or distortion must be minimised and not affect the performance of the brakes.
- 4.6.2 Brake pedal leverage ratio should closely resemble the pedal ratio of the vehicle from which the master cylinder was sourced. Generally ratios are in the order of 5:1 to 7:1:refer to Figure 4(a) to calculate the ratio.
- 4.6.3 Brake pedals must be mounted so that during operation, no part of the brake pedal makes contact with any other component or otherwise restricts the operation of the brake system in any way. Sufficient clearance must be provided to ensure that in an emergency braking situation, the brake pedal is readily accessible without any interference from any other components. The brake pedal must be located to allow free access without obstruction by the steering column.
- 4.6.4 Pedal pads are to have non-slip surfaces.
- 4.6.5 The brake pedals should be constructed in such a manner that welds between the actuating arm(s) and the pedal shaft completely encircle the shaft. Alterations to cast or forged brake pedals must be carried out by a competent tradesperson able to certify the work.
- 4.6.6 Pushrods between the master cylinder and the pedal arm must be straight and must act through the centreline of the master cylinder bore. If a straight pushrod cannot be used alone, additional leverage systems such as a bell crank should be used provided that the system is endorsed by an Examiner.
- 4.6.7 Manufactured pushrods used in braking systems must have a diameter not less than that specified in the Table 4.2.

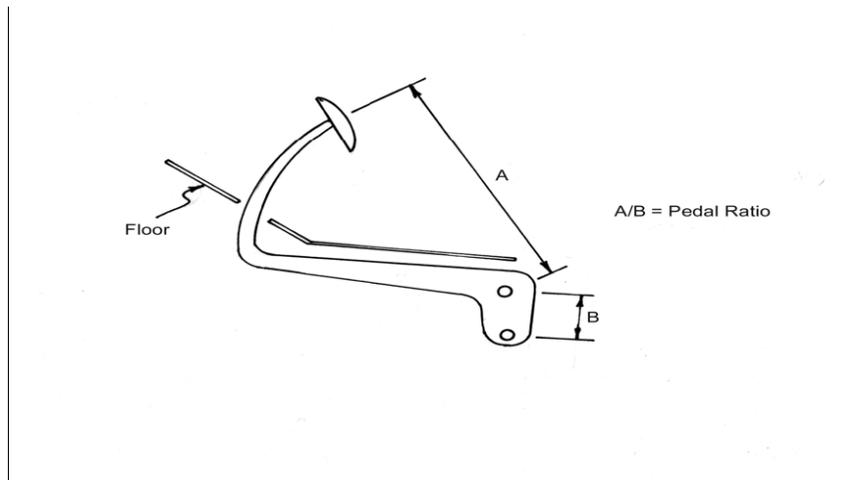


Figure 4(a) Brake pedal leverage ratio

Note: If the pedal contacts the floor of the Street Rod before the master cylinder piston has reached the end of the primary piston travel, a single circuit failure will render the brakes inoperable.

Pushrod Length	Pushrod Diameter (min)
Up to 250mm	10mm
250 to 400mm	12mm
400 to 600mm	14mm
600 to 800mm	16mm

Table 4.2 Pushrod diameters

vi. 4.7 FLUID LINES AND HOSES

- 4.7.1 Rigid brake pipes must be made from tubing designed for use with automotive brake systems. Connections must be flared in a manner suitable for the chosen fittings and the tubing is to be supported with a rigid mount at intervals of no more than 300mm. Brake pipes must not be joined by welding or brazing.
- 4.7.2 Only flexible brake lines and hoses marked as complying with SAE J1401 or equivalent must be used. Flexible braided hoses must not be forced into a radius tighter than the manufacturer's specified minimum radius for each hose diameter.
- 4.7.3 Brake lines that are passed under the chassis rail or below cross members must be protected. Brake lines must be installed without sharp bends. Radius of bends must not be tighter than the manufacturer's specified minimum radius for each line diameter.

vii. 4.8 BRAKE FLUIDS

- 4.8.1 Brake fluid compatible with the braking system must be used.
- 4.8.2 Silicone brake fluid must only be used if all seals and other components are compatible with silicone fluid. Incompatible compounds react with silicone-based fluid causing swelling of the seals in the master cylinder, blocking off the compensating port and thereby locking the brakes on or off.
- 4.8.3 DOT 3, DOT 4 and DOT 5.1 poly-glycol based fluids are all compatible despite any differing colour dyes used, and these can be used in most road going brake systems. The brake fluid used should be a minimum DOT3.
- 4.8.4 DOT 5 silicone based fluid is not compatible with the more commonly found poly-glycol based fluids or the seals used in most road going and commonly found braking systems.
- 4.8.5 Further advice should be obtained from a brake specialist.

