

Guide to Modifications for Motor Vehicles

For further information please write to the Manager, Vehicle Safety Branch
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May 2003

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1. INTRODUCTION

Regulation 819 (1) of the Road Safety (Vehicles) Regulations 1999 provides that a person must not modify a vehicle intended to be used on a highway except with the approval of or in accordance with guidelines published by VicRoads.

For the purposes of this regulation VicRoads has approved the more common modifications which generally do not affect a vehicle's continued compliance with the Standards for Registration. A list of these approved modifications is published in Part 3.

Modifications made in accordance with this Guide are considered to be approved modifications. However, where this guide requires the modification to be the subject of an Approval Certificate, the modification is not approved until the Approval Certificate, has been accepted by VicRoads. In addition, approval for any modification not included in this Guide will generally be subject to an Approval Certificate.

An "Approval Certificate" is a technical assessment certificate issued by a participant in the Vehicle Signatory Scheme (VASS). The certificate is evidence that the modified vehicle has been inspected and that all modifications have been carried out and completed in accordance with recognised standards and codes of practice and that the vehicle in its modified form continues to comply with the Standards for Registration. A list of VASS signatories is available from any VicRoads Registration and Licensing office, the VicRoads internet site or by contacting VicRoads on 1300 360 745.

2. GENERAL

Generally an Approval Certificate is required for a modification to any part of a vehicle that is covered by an Australian Design Rule (ADR).

Modified vehicles must continue to comply with all applicable Standards for Registration which include the applicable ADRs. The vehicle owner is responsible for ensuring that the vehicle complies and is in a roadworthy condition at all times.

If the modified vehicle is to be registered a current Certificate of Roadworthiness issued by a Licensed Vehicle Tester must be supplied together with the Approval Certificate.

3. APPROVED MODIFICATIONS

For the purposes of Regulation 819 of the Road Safety (Vehicles) Regulations 1999 the following modifications, which generally do not affect the vehicle's continued compliance with the Standards for Registration, are approved modifications.

This approval does not apply to a modification which has been carried out in a manner which does not comply or would cause the vehicle not to comply with an applicable standard for registration:

3.1 GENERAL MODIFICATIONS

- Additional lighting—forward and rearward facing lamps which comply with the standards for registration;
- Air horns (single tone only);
- Air conditioner;
- Air shock absorbers (provided the vehicle maintains its original attitude);
- Alarm systems;
- Bull bars, which comply with the requirements in VSI 1
- Fifth wheel and turntable assemblies fitted to comply with the version of Australian Standard 1771 Articulated Vehicles—Fifth Wheel Assemblies, current at the time of installation;
- Markings, painting, speed strips, reflective (prism pattern) film (on body work only);
- Mesh stone shields (windscreen and lamps);
- Mudflaps, spats and pebble guards;
- Radio and sound systems including aerials, speakers and fittings;
- Roof racks;
- Stabiliser bars, torque rods and traction rods provided the ground clearance is not reduced to less than 100 mm;
- Supplementary mirrors not interfering with or significantly reducing the area of the mirrors required by the standards for registration;
- Sun visor (exterior) and rear window louvres;
- Tow bars, which comply with the requirements in VSI 24;
- Wheel chair restraints which comply with the requirements of the version of Australian Standard 2942, Wheel Chair Occupant Restraint Assemblies for Motor Vehicles, current at the time of modification;
- Window tinting which complies with the requirements in VSI 2.

3.2 ENGINE CHANGES

- An engine or transmission change where the replacement is of the same model, type and capacity as one fitted to a vehicle of that model as original equipment; or
- An engine or transmission offered as an option for that model by the manufacturer of the vehicle provided both the modification and assessment are carried out in accordance with the guidelines contained in this information sheet.

3.3 OTHER MODIFICATIONS

- Any other modification which does not adversely affect the structural integrity of the vehicle, its handling characteristics or its compliance with the relevant standards for registration.
- Equipment or accessories equivalent in quality, performance and safety to those fitted to the vehicle or supplied or recommended by the vehicle manufacturer as original equipment or accessories.

4. GROUND CLEARANCE

The ground clearance of a vehicle measured from a horizontal road surface to any point on the underside of the vehicle except the tyres, wheels, wheel hubs and brake backing plates shall, with the vehicle in its loaded state as specified by the manufacturer, be not less than:

- for any point in the width of the vehicle which is within one metre fore and aft of any axle, 100 mm;
- for the mid-point between any two consecutive axles, the dimension in millimetres obtained by multiplying the distance in metres between those two axles by 33.33.

5. LOWERING OR RAISING OF VEHICLES

A vehicle may be lowered or raised provided the clearance between a suspension component and its associated bump stop is not altered by more than 1/3 of that specified by the manufacturer. In addition, the original relationship between the front and rear suspension heights must not be unduly affected.

Suspension coil springs must not be shortened by cutting. If lowering blocks are used, they must be manufactured from either steel, aluminium or a metal of equivalent hardness. The vehicle must not be raised by the use of extended or adjustable shackle plates.

6. AXLES, SUSPENSION AND STEERING COMPONENTS

An Approval Certificate is required for any modification to axles, suspension or steering components.

Modifications to any of these components should be carried out by selecting production components which do not require cutting, heating, bending or welding. However, where cutting, heating, bending or welding cannot be avoided, acceptable testing, which may include x-ray or other non destructive methods, must be undertaken before an Approval Certificate can be issued.

Electroplating of axles, suspension and steering components is not permitted.

7. STEERING WHEELS

Replacement steering wheels must be not less than 330mm in diameter. If the original steering wheel was designed with a recessed or padded hub, the replacement wheel must be of similar design.

Steering wheels fitted to passenger cars manufactured after 1970 must not be replaced with any steering wheel which would cause the vehicle not to comply with the energy absorption requirements for steering columns in ADR 10.

Vehicles manufactured after June 1995, which are required to comply with ADR 69/.. (Full Frontal Impact Occupant Protection), may only be fitted with steering wheels certified by the vehicle manufacturer as suitable for that vehicle.

8. WHEELS AND TYRES

Replacement wheels and tyres may be fitted provided that they comply with the following requirements:

- The width of any replacement rim must not be:
 - more than 25mm greater than the widest wheel specified by the vehicle manufacturer for that model or vehicle series; or
 - less than the width of the narrowest rim specified by the vehicle manufacturer for that model or vehicle series.
- Rims, which have been widened, must have no more than one peripheral weld. All welding must be carried out in accordance with recognised engineering standards, and the rims must comply in all respects with specifications contained in the Tyre and Rim Standards Manual published by the Tyre and Rim Association of Australia.
- The overall diameter of any replacement rim and tyre must not be:
 - more than 15mm greater than largest diameter tyre specified by the vehicle manufacturer for that model or vehicle series; or
 - more than 15mm less than the smallest diameter tyre specified by the vehicle manufacturer for that model or vehicle series.
- Rim and tyre combinations must be in accordance with the recommendations contained in the Tyre and Rim Standards Manual published by the Tyre and Rim Association of Australia and have a load and speed rating equal to or better than that required by the standards.
- The wheels and tyres must not foul any part of the body, suspension, steering or brake components at any position of the suspension travel or steering movement, and, when in the straight ahead position,

the guard or bodywork of the vehicle must cover the section width of the tyre.

Note: The section width of a tyre is the distance between the outsides of the sidewalls of an inflated tyre excluding any markings, bands or ribs.

The maximum allowable track increase is:

- in the case of a front axle—25 mm;
- in the case of a rear axle with independent suspension—25 mm;
- in the case of other rear axles—50 mm; and
- in the case of a motor vehicle manufactured with a combination of front wheel drive, McPherson strut front suspension and negative scrub radius steering geometry, no increase in wheel track is permitted unless specified by the vehicle manufacturer.
- in the case of a motor vehicle fitted with a diagonally split braking system (i.e. one front wheel and opposite rear wheel on same hydraulic circuit), no change in the wheel track dimension is permitted.

Spacers between the wheel and hub are not permitted unless provided by the vehicle manufacturer as original equipment.

Wheel nuts must engage the thread of the wheel stud for at least the same length as the original wheel nut and have the same taper as the mating wheel stud hole.

The stud pattern of the replacement wheel must be the same as the original. Re-drilling wheels, hubs, drums, discs or axle flanges is not permitted. Wheels with slotted stud holes are not permitted.

Aluminum alloy wheels (mags) are acceptable provided they meet the above requirements and are legibly and durably marked to show compliance with one of the following standards:

- AS 1638 Australian Standard
- DOT Department of Transport USA
- JWLT Japanese Light Alloy Wheel Truck and Bus
- JWLT Japanese Light Alloy Wheel
- JIS Japanese Industry Standard
- KBA German TUV Certification
- VIA Vehicle Inspection Association Japan

Repaired or damaged alloy wheels are not acceptable.

9. BRAKE CONVERSIONS

Generally an Approval Certificate is required for any modification of service brake systems. However, where the modification converts the original braking system to another system supplied by the vehicle manufacturer as optional equipment for a vehicle of the same make and model, other evidence may be acceptable.

Service brakes may be converted from mechanical to hydraulic, air, or vacuum operation, or from drums to discs provided the conversion is properly engineered in

accordance with the practices of recognised braking system design. However, re-drilling, grinding or other modifications to disc brake callipers, discs, hubs, drums, axle flanges, steering or suspension components to facilitate the brake conversion or the fitting of replacement wheels are not permitted.

10. BODY-CHASSIS STRUCTURAL ALTERATIONS

An Approval Certificate is required for any modification to the chassis or frame of a vehicle. An Approval Certificate is also required for modifications to the occupant compartment and panels forward of the firewall of any passenger car manufactured after 1972.

A sectionalised repair (cut and shut) carried out in accordance with VSI No. 25 is not considered to be a modification. However, if the repair involves replacing the front section of the vehicle or a section in which the VIN is located then the vehicle's identity will have to be confirmed and you will need to contact a VASS signatory before proceeding with the repair. The damaged vehicle together with the replacement section must be available for inspection by the signatory.

11. REPLACEMENT ENGINES

An engine which is of a type offered by the manufacturer as an option for that vehicle may be fitted provided that:

- All other related components including structure, suspension, brakes etc., are equivalent to those fitted to a vehicle of the same model supplied with that engine type as optional original equipment by the manufacturer; and
- Acceptable evidence is supplied which certifies that these components are fitted in accordance with factory methods and the vehicle in its modified form is safe and complies with the applicable regulations for that model vehicle.

An engine which is not of the same type as offered by the manufacturer of the vehicle as original, but is similar in power, weight and emission standards to that of the original engine, may be fitted to such a vehicle. If alteration to the vehicle's frame or structure is involved and specially fabricated supports or structures are used, an Approval Certificate must be supplied.

Where it is intended to fit an engine which is significantly different from that offered by the manufacturer as original or an option, (e.g. four to six cylinder or six to eight cylinder), then an Approval Certificate is required as evidence that the vehicle in its modified form is safe and meets all the applicable construction and emission regulations for that model. It is recommended that a VASS signatory is consulted before commencement of this type of modification.

12. EXHAUST SYSTEMS

Modified and alternative exhaust systems are permitted if they satisfy the following requirements:

- The exhaust outlet must extend at least 40mm beyond the furthest outboard or rearmost joint of the floor pan which is not continuously welded or permanently sealed. The outlet must not protrude beyond the perimeter of the vehicle when viewed in plan.
- If to the side of the vehicle, the outlet must discharge downwards at an angle to the horizontal of not less than 15 degrees nor more than 45 degrees and to the rear of any adjustable window or vent. If the vehicle is manufactured after June 1988, the discharge must be to the right-hand side of the vehicle.
- If to the rear of the vehicle, the exhaust outlet must discharge at not more than 10 degrees above or 45 degrees below the horizontal.
- No exhaust system whether it be functional or ornamental is to be mounted in such a manner as to create a hazardous situation particularly from hot surfaces or projections.
- All piping and muffler systems must be adequately supported.
- Exhaust extractors may be fitted to a motor vehicle manufactured before July 1976, provided they do not foul any part of the steering, suspension, braking or fuel systems. In all other cases evidence either in the form of an Approval Certificate or acceptable evidence from the extractor manufacturer to show that the vehicle continues to comply with all applicable emission regulations will be required.

Evidence from the extractor manufacturer is acceptable if it includes information:

- identifying the extractors as appropriate for the vehicle;
- certifying that the extractors have all the features and fittings necessary to allow the vehicle's emission control system to be reconnected and work properly; and
- describing how the extractors should be fitted.
- The vehicle must continue to comply with the ground clearance requirements.
- There must be no escape path for exhaust gases other than the exhaust outlet, and the vehicle must continue to comply with the noise emission standards applicable to it.

13. FUEL SYSTEMS

Replacement carburettors may be fitted to any motor vehicle provided the vehicle continues to comply with the gaseous emission requirements applicable to it.

Any drip tray positioned under the carburettor must be constructed so that any overflow of fuel will not remain in the tray nor flow onto any exhaust pipe, starter motor, alternator or other potential ignition source.

Fitting of turbo chargers other than those fitted by the original manufacturer must be covered by an Approval Certificate.

The petrol filler pipe inlet and cap must be located on the outside of the vehicle, unless originally fitted inside by the manufacturer.

All LPG installations must comply with the technical requirements of the version of Australian Standard AS 1425 current at the time of conversion and be fitted with an acceptable LPG Compliance Plate if converted to operate on LPG on or after 1 February 1993.

All CNG installations must comply with the technical requirements of Australian Standard AS 2739 current at the time of conversion and be fitted with an acceptable *CNG Compliance Plate* if converted to operate on CNG on or after 1 August 2000.

An acceptable *LPG or CNG Compliance Plate* is one issued by:

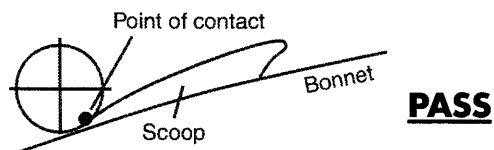
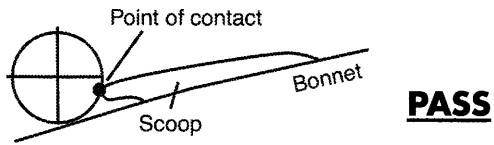
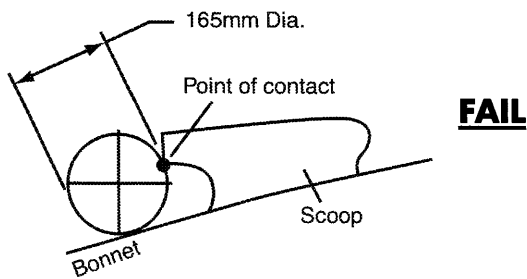
- The Automotive Alternative Fuels Registration Board (AAFRB). (These are only issued to businesses registered with the AAFRB—telephone (03) 9829 1111);
- other recognised State and Territory regulatory authorities; or
- approved volume vehicle manufacturers e.g. Holden, Ford, etc.

See VSI 27 for more information on LPG or CNG installations.

14. BONNET SCOOPS AND PROTRUSIONS

A bonnet scoop or cover may be fitted to a vehicle provided:

- It is of a type offered by the manufacturer of the vehicle as an option for that model or series; or
- It is constructed so that all edges and protrusions are suitably radiused and there are no single openings larger than 4000mm² (equivalent to a 65mm circle) towards the front of the vehicle; and
- It permits the driver to have a clear uninterrupted view, through the full width of the windscreen of all parts of the road surface 11 metres forward of the steering wheel viewed from any driving position permitted by the range of adjustment of the driver's seat; and
- When a 165mm diameter disc is placed on the bonnet in front of the scoop or bonnet projection and rolled rearwards until it touches the scoop, no point of contact between the disc and the scoop or bonnet projection shall lie above a horizontal plane passing through the centre of the disc. See diagrams overleaf; and



- No metal, engine mounted component, likely to increase injuries to any person may project through and above the bonnet profile without being protected with a cover mounted on the bonnet and complying with the above requirements.

15. EXTERNAL GAUGES

Gauges may be mounted externally forward of the windscreen in a position visible to the driver provided they meet the following requirements which are effectively the same as the bonnet scoop and protrusion requirements:

- The gauges and any attaching brackets or covers must be of a smooth construction with the edges suitably radiused so that they are not likely to increase the risk of injury to a person;
- The surface of any part of the gauge or cover visible to the driver must not be more reflective than the general bodywork of the vehicle;
- If the gauges have instrument lighting then the intensity of the light must not be greater than that of the interior instrument panel;
- The gauges or covers must not prevent the driver from having a clear uninterrupted view through the full width of the windscreen of all parts of the road surface 11 metres forward of the steering wheel viewed from any driving position permitted by the range of adjustment of the driver's seat.
- If the gauges or mounting brackets have sharp edges or are constructed in such a way that the likelihood of injury to any person is increased then they must be covered by a fairing which presents a smooth surface when viewed from the front and side of the vehicle.

It is recommended that pressure gauges are of a type that are electrically controlled, however if pressure lines are required to operate the gauges then the lines must be suitable for the pressures and temperatures involved,

braided type lines are preferred. The lines must be appropriately supported and routed so that they are not likely to fail or be damaged during normal use.

16. PROTRUSIONS

A modification to a vehicle must not result in:

- Any object or fitting, protruding from any part of the vehicle in a manner likely to create the risk of bodily injury to any person;
- Any component, feature object or fitting on the vehicle whose design, construction and/or condition and the manner in which it is affixed, is likely to create the risk of bodily injury to any person;
- Any bumper bar which does not have its ends turned towards the body of the vehicle to a sufficient extent to avoid any risk of hooking or grazing any person;
- Vertical supports forward of the windscreen for use in conjunction with overhead carriers where such attachment will adversely affect the vehicle driver's forward field of view. See VSI 29 for more information.

17. ADDITIONAL TYPES OF LAMPS AND LIGHTING

Individual application must be made to VicRoads for approval to fit any lamps or lighting systems such as flashing or rotating warning lamps that are not of a type required or permitted by the Standards for Registration. Lamps designed for marine or aircraft application are not permitted.

The standards specify colour and performance requirements for lamps on a vehicle. To ensure continued compliance with these requirements any lamp cover fitted to a vehicle must be clear, untinted, uncoloured and clean.

Further information on lighting requirements is contained in VSI No. 10.

18. GLAZING (WINDSCREEN AND WINDOWS)

All replacement or modified windscreens, windows, glazed partitions, etc. must be of appropriate automotive safety glass or other approved material and must comply with the Standards for Registration.

The luminous transmittance of all glazing material, including any applied tinting must also comply with the Standards for Registration.

Further information on light transmittance requirements is contained in VSI 2.