



**Government
of South Australia**

Department for Transport,
Energy and Infrastructure



**Department for Transport, Energy and
Infrastructure (DTEI) – Confederation of
Australian Motor Sport (CAMS)**

DEDICATED RALLY CAR MANUAL

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Department for Transport, Energy and Infrastructure (DTEI) – CONFEDERATION OF AUSTRALIAN MOTOR SPORT (CAMS) DEDICATED RALLY CAR MANUAL

What is the Confederation of Australian Motor Sport?

The Confederation of Australian Motor Sport Limited (CAMS) has been the custodian of motor sport in Australia since 1953.

CAMS is responsible for all forms of four-wheeled motor sport which includes categories such as circuit racing, rallying, off roading, historic competition and other general motor sport activities (including motorkhana, speed, Hillclimb, autocross and khanacross events).

CAMS is a non profit organization, and operates under a delegated authority from the Federation International de l'Automobile (FIA) via the Federation Internationale du Sport Automobile (FISA).

Currently, there are approx 52 000 members with over 9000 accredited officials and more than 350 affiliated car clubs.

Nearly 6,000 members actively participate in open road related activity. Open road competition, in fact, encompasses all forms of road based activity from the Australian Rally Championship to the many club-based navigational trials held each weekend in all states of Australia.

Australian motor sport, and its controlling body CAMS has an excellent reputation, is held in high regard throughout the world for its safety practices for competitors, officials and spectators.

Objective

It is the objective of CAMS to achieve a restricted number of modifications to motor vehicles which are used in CAMS sanctioned Rally competition.

These regulations reflect the agreement between the relevant Government authorities and CAMS for allowable modifications to rally cars.

In order to achieve this end result, CAMS recognises the need for vehicles which have been modified, to be examined by an authorised CAMS scrutineer and on some occasions, a Government inspector who may be able to attest to the integrity of any modifications, in line with the contents of this document. It is expected that upon approval of the modifications by a CAMS accredited scrutineer, limited use of the vehicle, as is explained in Part 3 of the Statement of Principles, will be allowed.

After approval of the vehicle by a CAMS accredited scrutineer, all vehicles seeking CAMS Dedicated Rally Car Status must be presented to DTEI Vehicle Inspection facility at Regency Park for the initial issuing of a Certificate of Exemption. Thereafter, the responsibility for ensuring continuing compliance with the dedicated rally car status lies with CAMS and its scrutineers.

It should be pointed out that at all times, responsibility for compliance with statutory regulations lies with the vehicle owner.

It is envisaged that all CAMS Dedicated Rally Cars will need to undergo the proposed CAMS eligibility examination by a CAMS accredited scrutineer to retain statutory registration. A list of all CAMS Dedicated Rally Cars will be supplied to DTEI. This list will be reviewed by CAMS and the approved scrutineers to ensure these vehicles are competing in CAMS sanctioned "Rally" events during each calendar year and that those vehicles comply to the technical requirements detailed in this manual.

All CAMS Dedicated Rally Cars, which no longer meet the criteria set out in this document will cease to be considered a CAMS Dedicated Rally Car

Upon the successful presentation of a vehicle to the Scrutineer, CAMS will approve the "LETTER OF INTRODUCTION" for the owner. . This must then accompany the vehicle at the time of inspection by DTEI.

Background

The primary objective of regulating motor vehicle modifications is to ensure that the vehicle is safe, and complies with the requirement of the Road Traffic Act and Regulations including exhaust noise.

It is generally accepted that a motor vehicle which complies with the most recent statutory requirements, including Australian Design Rules for Motor Vehicle Safety and Emissions, is safer and also less harmful to the environment than a motor vehicle complying with earlier legislation. When considering the modifications which this document addresses, every endeavour has been made to arrive at a level of testing and assessing that will keep the cost of modification and construction to an acceptable limit without compromising the level of safety and environmental acceptability.

Purpose

The purpose of this document is to establish technical and administrative guidelines to assist inspectors to provide consistent and reliable reports for modified and individually constructed vehicles, which will be used primarily for CAMS authorised Rally competition. The administrative guidelines are a separate document titled “General Requirement for Dedicated Rally Cars – Administrative Procedures”.

Scope

The requirements, outlined in this document, provide general guidance only. They are not exhaustive and the CAMS scrutineer and DTEI inspector are required to exercise their knowledge, expertise and experience to make a full assessment of the vehicle.

If a CAMS scrutineer is unable to assess the merits of a modification, then the vehicle will be referred to the DTEI Vehicle Services Section for assessment. No authorising documentation for registration is to be issued by the CAMS scrutineer in this instance until the matter is resolved

The DTEI/CAMS Dedicated Rally Car agreement is only applicable to vehicles registered in South Australia and primarily used and operated in South Australia. If the vehicle resides in another state, the South Australian registration must be cancelled and new registration procured from the state of residence.

The Dedicated Rally car program is designed for vehicles competing in CAMS sanctioned “Rally” activities including Rally Sprints, Cross Country Rally , Non-Special Stage Rally and Special Stage Rally events as described in the CAMS Manual of Motor Sport.

For the purpose of this Dedicated Rally Car Manual, Touring Road Events (TRE) ,Touring Assemblies (TA), Navigational events and Auto Tests are NOT considered to be “Rally” activities as these events can be contested in Standard Road Registered Vehicles.

Vehicles being used for Circuit based CAMS sanctioned activities are also not covered by the Dedicated Rally Car Manual and Program.

Statement of Principles

1. General

Modifications cause a vehicle to differ in performance, construction and/or appearance from that of the recognised production vehicles. A vehicle, which cannot be identified by chassis or body as a previously recognised production vehicle, is considered to be a new individually constructed vehicle and is subject to all the regulatory requirements applicable to its class at its date of construction.

Vehicles are modified to improve performance and/or appearance and/or to adapt them for particular uses. Unauthorised modifications may have an adverse effect on roadworthiness and the environment, so precautions are necessary to make sure that a vehicle's inbuilt standard or safety, and reliability are not adversely affected: therefore no modification will be approved if it adversely affects the strength, safety, reliability, and controllability of the vehicle.

Following lengthy negotiations, an agreement now exists between the various State Governments and CAMS covering certain modifications that can be applied to CAMS registered rally cars.

Vehicles which are registered with CAMS as Dedicated Rally cars will be inspected a minimum of once every year by the approved CAMS scrutineers to determine compliance with the agreement. Completion of the inspection will be recorded in that vehicles CAMS Log Book.

It may be necessary for a rally car to be inspected by the State Government authorities in the event of a dispute between the vehicle owner and the CAMS scrutineer. In these instances, the Government authority may require an engineering report, at the vehicle owner's expense, to determine the merit of the modification/s.

A major requirement for modified vehicles is that any non-original component or assembly must comply with the regulatory requirements (eg. ADRs), at the date of modification unless a Certificate of Exemption is issued by DTEI.

It may, however, not be practicable to utilise, in all cases, components which meet the current regulatory requirements, ie the latest components may not be available or may not be able to be incorporated without extensive modification. If such circumstances can be established then, for any modification related to a non-consequential safety related component, the new component need only comply with the most recent requirements which do not necessitate extensive additional modifications.

The nature of modification and construction are so diverse that any one set of requirements cannot encompass all of them. Each type of modification or construction has to be considered on an individual basis and assessed accordingly, but must take into account the requirements outlined.

The following are regarded as modifications requiring inspection:

Modifications affecting the level or performance, safety, strength or reliability of vital systems such as brakes, suspension, steering, drivetrain or the integrity of the passenger compartment (including seat and seat belt anchorages).

- Any vehicle which has an engine of greater power output than the most powerful engine available as an option for vehicles of the same make and model. The power increase may result from a modification such as turbocharging or an increase in displacement volume. (An increase in displacement volume due to engine reconditioning within normal trade practice or up to 10% increase in power or torque is not considered to be an assessable modification).
- Any vehicle which has one or more critical original components of the following systems substituted by components or specifications different from those provided as standard or optional equipment for the vehicle concerned: axles, suspension systems, steering systems and braking systems.

2. Rally Cars Covered by this Manual

This document applies to dedicated rally cars (see explanation below) only and shall be read in conjunction with:

- For FIA Group A and Group N vehicles:
The regulations for FIA Group A and Group N vehicles from the FIA Yearbook, the CAMS Manual of Motor Sport and the relevant Homologation Papers; or
- For FIA Super2000 Vehicles:
The regulations for FIA Super2000 vehicles from the FIA Yearbook, the CAMS Manual of Motor Sport and the relevant Homologation papers;
or
- For Production Rally Cars (PRC):
The regulations for Production Rally Cars (PRC) from the CAMS Manual of Motor Sport; or

- For CAMS Group N(P) Rally Cars:
The regulations for Group N(P) Rally Cars from the CAMS Manual of Motor Sport; or
- For Tarmac Rally Cars:
The regulations for Classic and Modern Tarmac Rally Cars from the CAMS Manual of Motor Sport
- For other rally cars:
The General Requirements for Rally Cars from the CAMS Manual of Motor Sport

All of the Above category vehicles must comply to Schedule J of the Current CAMS Manual of Motor Sport.

A dedicated rally car is a road registered vehicle built for the sole purpose of competing in "Rally" events under the rules of the FIA and CAMS.

A dedicated rally car can only be used on public roads under the following circumstances:

- To participate in an official CAMS event.
- To drive the vehicle to and from all aspects of that event.
- To drive the vehicle to and from official promotional events, including media days and displays.
- To drive to and from maintenance/repair establishments. This may include testing and evaluation.
- Any other activities at the request of the SA CAMS office.

Closing Note

An owner is responsible for ensuring that the vehicle is in a roadworthy condition at all times and used responsibly in accordance with this manual.

Vehicle owners need to be reminded that responsibility for their actions rests with them. Inappropriate actions by any individual may result in the loss of the Dedicated Rally Car program and the working relationship with DTEI that currently exists.

Therefore, it is recommended that a roadworthiness check as well as any required inspection is carried out on the vehicle when modifications are completed.

Acknowledgment

CAMS wishes to thank and acknowledge the efforts of DTEI in the creation and implementation of this program. Without this arrangement Rally competition within South Australia would be very difficult.

Modifications Requiring Approval

These modifications are divided into four main areas:

1. Body/Chassis

- Strengthening, Seam Welding
- Insulation Material Trim
- Accessories
- Seats and Mounting Points
- Safety Belts/Harnesses and Mounting
- Roll Bars
- Fuel Tanks
- Lighting Requirements

2. Steering & Suspension

- Steering
- Suspension

3. Brakes

- Master Cylinder
- Conversion from Drum Brakes to Disc Brakes
- Replacement of Hydraulic Lines and Routing thereof
- Hydraulic Hand Brake

4. Engine

- Increasing of Power
- Exhaust System

Appendix A

- Seat Anchorages
- Hydraulic Brake Hoses
- Vehicle Configuration & Marking
- Engineering Instruction No 5 – Heating & Welding of Steering

1. Body/Chassis

Strengthening, Seam Welding

The welding of body joints, previously spot welded by the manufacturer, to be permitted.

The strengthening of all the suspended parts be allowed provided that the material used follows the original shape and is in contact with it.

Reinforcement from composite materials is allowed.

- 1.1.1 Mounting points for ancillary equipment may be relocated for removed eg. Spare wheel mounting bracket.
All additional equipment mounted in the passenger compartment ie spare tyre, fuel cans and fire extinguishers must be secured to withstand a force of twenty times their mass.
- 1.1.2 The original holes in the bodywork may be closed by the welding of plates.
- 1.1.3 The edges of the wing panels may be folded back if they protrude inside the wheel housing.
- 1.1.4 Jacking points may be strengthened, moved and increased in number.

1.2 Insulation Material/Trim

Modifications such as the removal of trim, must not increase the risk of injury to vehicle occupants. Areas which have the potential to cause injury must be suitably padded and all sharp edges must be treated prior to fixing durable high density impact absorbing material. For further information refer to the current CAMS Manual of Motor Sport.

1.3 Accessories

Vehicles may be fitted with an alternative steering wheel to the satisfaction of CAMS and its scrutineers.

Under body protection plates may be fitted (eg. Fuel tank and engine sump guards).

Additional safety fasteners may be fitted to the windscreen and to any side windows.

- 1.3.1 The original boot and bonnet fasteners may be retained, and/or supplemented by an additional fastening system.
- 1.3.2 SRS air bags may be disabled and/or removed. If an air bag is not disabled, then nothing shall be mounted in the path of deployment of the air bag (eg, distance measuring devices). If disabled, a decal to that effect shall be affixed to the automobile adjacent to, or under, the driver and passenger windows.
- 1.3.3 The capacity of the washer tank may be increased and its location may be moved to inside the cockpit.
- 1.3.4 Dash instruments (ie. Speedometers, fuel gauges, etc.) may be added to or replaced. There are no requirements to have variable light intensity for the instruments.
- 1.3.5 The warning device (horn) may be replaced but must be a monotone. Another operating device (switch) may be situated on the passenger's side of the vehicle.

1.4 Seats & Mounting Points

Alternative seats may be fitted to the satisfaction of CAMS and its scrutineers, If the original seat mounting points are not used, the seat must be mounted in accordance with Appendix A – Seat Anchorages.

- 1.4.1 The rear seats may be removed completely including head restraints and seat belts.
- 1.4.2 The seating capacity of all rally cars will be specified on the "Dedicated Rally Car approval plate." This will be specified as two persons unless special application for a higher seating capacity is submitted. Group N vehicles that retain their rear seats and seat belts will have their seating capacity specified as two persons.

1.5 Safety Harnesses & Mounting Points

Safety harnesses complying with Schedule I of the CAMS Manual of Motor Sport may replace the existing safety belts.

Full harness and Window Net (Where required) be to a substantial part of the vehicles structure.

1.6 Roll Over Protection/Safety Cages

The fitment of Roll Over Protection is Mandatory. All Safety cages must comply to Schedule J of the CAMS Manual of Motor Sport.

1.7.1.1 Fuel Tanks

Additional or replacement fuel tanks are permissible providing they meet the requirements of the CAMS Manual of Motorsport:

1.7.1 No part of the fuel tank or the filler pipe shall be located within or above the vehicle cab unless separated by a fire resistant barrier (s) designed to prevent any leakage from entering the driver's cab or any other enclosed passenger or goods area.

1.7.2 Design Requirements

1.7.2.1 The design of the fuel system shall not provide for gravity or self sustaining feed to the carburettor or injector.

1.7.2.2 At least one safety vent shall be provided in that part of the fuel tank which is above the level of fuel when it has been filled.

1.7.2.3 No safety vent shall discharge into an enclosed compartment. Except in the case of a diesel fuel system, the fuel withdrawal line shall enter the fuel tank either at a point above the level of the fuel when it has been filled, or at a point on the inboard side of the tank.

1.7.3 Capacity of Tanks

1.7.3.1 The total capacity of the fuel tank must not exceed the provisions outlined in Schedule N of the CAMS Manual of Motor Sport.

1.7.3.2 The re-routing of fuel lines through the cabin is permitted, but it is not allowed to have any joints and it must be protected from impact damage.

1.8 Lighting Requirements

Must Comply to all lighting regulations as per the current CAMS Manual of Motor Sport.

NOTE: All Reversing Lamps be it factory fitted or additional, must all be activated Automatically with the selection of Reverse Gear.

2. Steering & Suspension

2.1 Steering

Modifications to steering components by cutting, heating or welding are not permitted unless an engineering report including x-ray's, prepared by a Chartered Engineer is presented which demonstrates that the modified component meets with the requirements of Engineering Instruction Number 5 – Heating and Welding of steering Components. (Refer Appendix A)

2.2 Suspension Components

The strengthening of suspension components by the welding of additional metal providing it follows the original contour of the part being modified is permissible.

- 2.2.1 The material in suspension joints may be changed (eg. Rubber to urethane), and it is allowed to change the joints to rose joints.

3. Brakes

3.1 Master Cylinder

The replacement of the brake master cylinder is allowed providing that this does not decrease the efficiency of the service brake system.

3.2 Conversion of Drum Brakes to Disc Brakes

An engineer's report is normally required for any modification of the service brake system fitted to passenger vehicles. However, where the modification converts the original braking 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 drum to discs provided the conversion is properly engineered in accordance with the practices of recognised braking system design.

3.3 Replacement of Hydraulic Lines and Routing

The replacement of hydraulic hoses is permitted from those supplied by the manufacturer, but they must meet the standards of that laid down in Appendix A – Hydraulic Brake Hoses, and proof of this must be given to the scrutineer assessing the vehicle.

3.4 Hydraulic Hand Brakes

The use of a hydraulic hand brake is permitted provided a tandem master cylinder or split system is used, and it must be able to be activated whilst the driver is in the normal seating position.

3.4.1 “Fly-off” hand brake lever may be installed.

3.4.2 If a “Fly-off” hand brake lever is installed, it must incorporate a mechanism to allow it to lock in the “on” position.

4. Engine/Exhaust

4.1 Engines:

- 4.1.1 The engine installed in the vehicle must comply to all relevant sections of the CAMS Manual of Motor Sport.
- 4.1.2 Removal or Modification of engine emission control devices is permitted in accordance with the Current CAMS Manual of Motor Sport. (for example and not limited to: Catalytic converters, Charcoal Canisters, Crankcase Breather Systems)
- 4.1.3 The installation of Additional Crankcase breather systems “Catch Cans” that vent to Atmosphere are permitted in accordance with the CAMS Manual of Motor Sport.

4.2 Substitute Engines:

Engines that are installed into the vehicles under the CAMS engine substitution guidelines as laid out in the relevant sections of the CAMS Manual of Motor Sport may require Additional engineering or approval subject to the requirements of DTEI.

4.3 Exhaust

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

- 4.3.1 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 which could permit direct access of exhaust gases to the passenger compartment, but must not protrude beyond the perimeter of the vehicle when viewed in plan.
- 4.3.2 If to the side of the vehicle, the exhaust outlet must discharge downwards at an angle to the horizontal of not less than 15 degrees not 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.
- 4.3.3 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.

- 4.3.4 No exhaust system whether it be functional or ornamental is to be mounted in such a manner as to create a hazardous situation from hot surfaces or projections with which persons outside the vehicle are likely to contact.
- 4.3.5 Removal of emission control devices including Catalytic converters is permitted.
- 4.3.6 There must be no escape path for exhaust gases other than the exhaust outlet.
- 4.3.7 The noise emitted from the engine exhaust must not exceed 96dBA.

Appendix A

Seat Anchorages

Intent

To specify the requirements for seats, their attachment assemblies and their installation to minimise the possibility of occupant injury due to forces acting on the seat as a result of vehicle impact. All Seats and their Mountings must comply to all relevant sections of the CAMS Manual of Motor Sport.

Requirements

Seats if anchored through the vehicle floor made from sheet metal must be adequately secured by not fewer than four grade 8.8 bolts of minimum diameter of 8mm and 75mm x 50mm x 3mm steel backing plates. For double and triple seats, additional anchorage bolts are required. The corners of backing plates shall have a minimum radius of 5mm and the edges adjacent to the sheet metal shall be chamfered.

Hydraulic Brake Hoses

Intent To specify the performance requirements of hydraulic brake hoses in vehicles so that the risk of failure in service will be minimised.

Requirements Only brake hoses manufactured to comply with ADR 42 shall be used. Each brake hose assembly shall bear a distinctive designation prominently and permanently indicating the name or trade mark of its manufacturer.

Vehicle Configuration & Marking

Intent To specify the requirements for vehicle configuration (including dimensions) and markings.

Requirements Engine Number

An identification number shall be legible and permanently stamped on the main component of the engine at the time of its manufacture. The engine number must be entered in the CAMS Log Book for the vehicle.

Requirements Registration Plates

Provision shall be made for mounting a registration plate as determined by DTEI which is to be affixed to the front and rear of the vehicle.

No part of the vehicle, including any equipment shall be located as to obscure any part of the registration plates.

After the approval process has been completed a CAMS Dedicated Rally Car identification plate (including the vehicle's V.I.N.) shall be located in a prominent position within the engine compartment or front half of the Cockpit affixed to the primary vehicle structure.

Requirements 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 and wheel hubs shall, with the vehicle in its maximum laden condition, be not less than:

- for any point in the width of the vehicle which is within one metre fore and aft of any axle – 100mm;
- for the midpoint between 2 axles – 0.033 times the distance (in millimetres) between the axles; and
- for any other point – such a distance which will, if the wheels of one axle are on a plane and the wheels of the other axle are on another plane at an angle of 7 degrees 38 minutes to the first plane, allow the point to pass over the apex of the planes as shown in the following figure.

Engineering Instruction No. 5 – Heating & Welding of Steering Components

Requirements The hearing, or welding of steering components such as steering connecting links, tie rods, pitman and idler arms etc, will be acceptable to the DTEI, Driver & Vehicle Operations subject to a report from a Chartered Professional Engineer being presented, that confirms that the modified parts are at least as strong as the original and contain no latent defects. Every modified part must be given a unique permanent identity number, which is duly recorded by the modifier. In that report, it will be required that the following points would be considered and commented on:-

- Material specifications of the component to be modified.
- Specifications of weld material and compatibility with the parent material if welding is involved.
- Description and/or diagrams of the preparation of the component if welding is involved.
- Details of preheating if required prior to modification.
- Details of heat treatment procedure after modifications.
- Hardness testing before and after modification of the modified zone.
- Results of non destructive testing.

NOTE: Welding must be conducted in accordance with Australian Standard 1554 Part 1, Welding of Steel Structures.

It is permissible to reduce the engineering report to a Letter of Conformity providing that the components being modified or manufactured are all to an identical specification and DTEI approval has been granted in accordance with the above.