

## SECTION 16

### PREPARATION FOR COMPETITION

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Due to the difficulty and illegality of using the Caterham Seven's full power on the public roads, many owners choose to use their cars in competitions, such as autotests, sprints, hillclimbs and circuit racing.

Caterham Cars, in conjunction with the British Racing and Sports Car Club (BRSCC), run two circuit racing championships specifically for Caterham Sevens. The first is for Rover K series Supersport cars in road going form and the second is for the 'Caterham Vauxhall Challenge' racecars. Both these series have very strictly controlled regulations aimed at providing close and cost effective racing.

This section of the Assembly Guide seeks to explain how to prepare a car for competition and details the organisation and administration required before you can take part.

Caterham Cars have appointed the following official motor sports agent to assist customers with all aspects of race car preparation.

Hyperion Motorsport	Contact:	Magnus Laird
Unit 3, Sudbury Road	Tel:	01787 478800
Little Maplestead	Fax:	01787 478533
Halstead,		
Essex	CO9 2SE	

#### **16.1 Driver Requirements for Competition**

1.1 In order to take part in any form of motorsport other than club autotests, it will be necessary to obtain a competition licence from the RAC, who co-ordinate all motorsport in this country.

For Sprints and Hillclimbs you will need a 'Speed licence' and unless you intend to contest a national championship, a 'Restricted licence' will suffice. No special qualification or experience is needed for a 'National licence', however.

For circuit racing, a Restricted Race licence will be needed and in order to be issued with one of these, you will need to visit your doctor with the licence application form for a medical check up. He will probably charge you a nominal sum for this. No specific level of fitness is needed but unless you have a history of heart disease, mental instability, a wooden leg, or VERY bad eyesight, you are unlikely to be disqualified. The fee for a first racing licence also includes a course at a racing driver school, which must be passed.

Licence application forms are obtainable from RAC MOTOR SPORTS ASSOCIATION LIMITED, MOTORSPORTS HOUSE, RIVERSIDE PARK, COLNBROOK, SLOUGH SL3 0GH. TEL: 01753 681736

1.2 Before taking part in motorsport, it will also be necessary to join an RAC affiliated Car Club. Because of the 'Restricted' licence, only members of invited clubs may participate in meetings. Unusually, no more than six clubs are invited, so it is important to join the correct club. For hillclimbs and sprints, we recommend that you join the BRITISH AUTOMOBILE RACING CLUB (BARC) who are invited to most hillclimbs and sprints in the UK and who also run their own championship. Their address is BARC, THRUXTON CIRCUIT, ANDOVER, HANTS SP11 8PN TEL: 01264 772696. Alternatively contact the RAC at the above address for details of your local clubs.

If you wish to participate in either of the Caterham race series', it will be necessary to register with ENTREPRIX LTD who have been appointed by Caterham Cars as co-ordinators. Contact Belinda or Jim McDougall at 20 LOUIES LANE, DISS, NORFOLK IP22 3LR TEL: 01379 640065 and they will be happy to help you with all racing matters. You will also need to become a racing member of the BRITISH RACING AND SPORTS CAR CLUB (BRSCC). Their address is BRSCC, BRANDS HATCH CIRCUIT, FAWKHAM, DARTFORD, KENT DA3 8NH TEL: 01474 874445.

There is another racing option for Seven owners, which is the Roadgoing Sportscar Championship run by the 750 MOTOR CLUB. This caters for all makes of road registered sports cars, from Porsches to Triumph Spitfires, run in appropriate classes. If you wish to join the 750 MOTOR CLUB LIMITED you need to contact Robin Knight at West View, New Street, Stradbroke, Suffolk IP21 5JG, Tel 01379 384268. For 1995 the 750MC race series may include a specific class for Ford powered Caterhams.

1.3 Once you have joined a suitable club and obtained a competition licence, the next step is to obtain entry forms for your chosen events. These can be obtained from the organising clubs and should be submitted in good time before the closing date. You should note that hillclimbs in particular tend to be oversubscribed, so get entries posted early in order to avoid disappointment.

The organisers will usually send you an acknowledgement of entry, normally by return, which will tell you whether your entry is accepted, rejected or placed on a reserve list. If you are told that you are a reserve, telephone to find out why, and what chance you have of actually racing.

1.4 When you receive your competition licence you will also receive a copy of the annual RAC Blue Book which contains all the regulations pertinent to motor sport in this country. In it you will find the specification for approved crash helmets and fireproof clothing which are mandatory for hillclimbs, sprints and circuit racing. Seven drivers will also need either goggles or a helmet visor.

1.5 At each competition meeting there is a routine which must first be observed by all competitors. Firstly, you will have to 'sign on'. You will need to present your competition licence, club membership card and (for road going classes) current MOT and insurance certificates. You should also hand in a completed commentators' information sheet. Assuming that all your documentation is in order, you will next be issued with a scrutineering ticket which should be taken, with your car, crash helmet and clothing, to the scrutineering bay. Your car helmet and clothing will be checked to ensure that you have observed all regulations. New helmets must carry an RACMSA sticker of approval so make certain that yours complies with the RAC regulations. An approval sticker can normally be applied by the scrutineer at your first event, phone him up and check beforehand however. If you are unsure about helmet approvals, buy yours from a motorsports specialist.

As general advice, always arrive in plenty of time. Although the final instructions issued a week or so before the event will give signing on, scrutineering and practice times, be prepared for queues or problems with your car. If the scrutineer fails to pass your car, you will need time to remedy the situation before practice. Under no circumstances will you be allowed to practice without a scrutineering pass and you will not be allowed to race if you miss practice. Occasionally it is possible to practice in a later session with a different class, which means that you will be able to take part in the event, BUT YOU WILL NOT BE TIMED which means that you will have to start at the BACK of the grid with a ten second penalty to boot!

## **16.2 Preparation for Circuit Racing**

Before a car can be raced, it will be necessary for it to be scrutineered. Two factors are taken into consideration during scrutineering; safety and eligibility. This manual does not seek to cover eligibility, as this depends on the type of event entered.

## 2.1 Rollover Bars

The standard Caterham bar is not suitable for racing and needs to be replaced by the competition bar. This is mounted to the rear suspension towers and is braced by a removable diagonal which locates within the passenger compartment. If you do not specify this bar when ordering your kit, do not worry since the threaded mounting for this brace is provided on all chassis.

Instructions for the fitment of this bar are provided in Section 14.14.

The FIA bars are specifically designed to fit underneath the hood, but drivers over six feet tall should note that the top of a helmeted head must be at least two inches below the top of the bar. If this not possible a rollover bar specialist such as Safety Devices should be consulted and subsequently any one off bar will need to be approved by Caterham to be eligible for their race series.

A rollcage is also available for the ultimate in protection - fitting instructions are supplied with the kit. This will also fit under the standard hood.

## 2.2 Seat Belts

The standard lap and diagonal belts are not suitable for racing and should be replaced by a four or six point competition harness. This uses the standard lower seat belt mountings, but the shoulder straps mount to the top rear crossmember where suitable threaded holes are provided. The harnesses manufactured for Caterham by LUKE carry FIA approval.

By some quirk in the law, these belts are not technically legal on the road and although the police are extremely unlikely to pick you up on it, some MOT testing stations may be particular.

## 2.3 Fireproof Rear Bulkheads and Impact Protection

RAC regulations state that there should be a firewall between the cockpit and petrol tank, so the boot floor area will need to be sealed. The carpet should be removed and the wooden floor covered with aluminium sheet. A box will also need to be fitted around the petrol filler. A suitable kit is available from Caterham to achieve this but note that the wooden floor must be retained as this provides impact protection not possible with aluminium sheet. Ideally the edges where this kit meets the existing aluminium floor and sides should be sealed using glass fibre but, in practice, scrutineers appear happy if the gaps are carefully sealed with tank tape or silicon sealant.

Alternatively and preferably a replacement boot floor and fuel tank protection kit is available in aluminium honeycomb from Caterham under the following part numbers:

T102 - Classic                      T103 - De Dion

Please note that injection cars are supplied with a honeycomb bootboard as standard, the rest of the kit is applicable however.

See Section 14.12 for fitting instructions.

This can be supplemented by fitting floor impact protection panels which are available for all models under the following part numbers. You should note that with these in place it is no longer possible to fit an adjustable driver's seat.

FI02 - Classic                      FI04 - De Dion

See Section 14.13 for fitting instructions.

In addition it will also be necessary to replace the existing fuel filler with a flush fitting variety, except on fuel injected cars which have this type of filler as standard. A kit is available from Caterham Cars under Part No. FF01, see Section 14.12 for fitting instructions.

#### 2.4 Fireproof Front Bulkheads

If a heater kit is not fitted, it will also be necessary to seal off the apertures in the front bulkhead provided for air circulation using aluminium sheet riveted or screwed into place and sealed with silicon sealant. A blanking angle is available to suit De Dion cars to blank off the fresh air heater apertures.

#### 2.5 Emergency Cut Off Switch

Should your car be involved in an accident or become stationary on the circuit, the Marshals will wish to isolate the battery and ignition circuits. An isolator switch must be fitted which enables this to be done from outside the car and we suggest that this is mounted within the triangulation of the windscreen stay on the offside. These switches, along with full wiring kits, are available from Caterham Cars. They also have the advantage of acting as very effective theft deterrents since they have a removable key. You will need to affix a warning sticker with an "OFF" arrow in the immediate vicinity of the switch and a protective "eyebrow" around the switch to prevent it being damaged in an impact. (see 14.10 for full fitting instructions)

#### 2.6 Fire Extinguisher

It is also a requirement for all cars to carry a 0.9 litre AFFF foam or equivalent fire extinguisher which should be securely mounted within reach of the driver. We suggest that the best location for this is bolted to the cockpit floor on the passenger side.

Fully plumbed in systems are expensive and not mandatory at present though likely to become a requirement in future. A hand held extinguisher will suffice. Please note that halon production has now ceased, and the use of halon may be banned at some point in the future. Various environmentally friendly alternatives are available.

### 2.7 Throttle Return Spring

Cars must be fitted with an alternate means of closing the throttle in case the normal return spring on the carburettor fails. Weber DCOE carburettors contain a small spring within them but since these are very weak and frequently break anyway, scrutineers are not happy to approve them. It is therefore necessary to fit an additional throttle spring acting directly on the butterfly spindle in some way. On cars fitted with twin Weber DCOEs or equivalent Dellortos we suggest that, since the spring in the Caterham installation works on the rear carburettor, you fit an extra spring on the forward one.

To solve this problem, Caterham Cars can supply a replacement operating lever for the forward carburettor with provision for an extra throttle return spring. The additional modified hair spring is attached to a secondary hole in the tubular throttle cable bracket. (This applies to Webers using Caterham throttle linkages only)

Operating lever Part No: 77826

Return spring Part No: 77827

### 2.8 Oil Catch Tanks

When racing, an engine's tendency to lose oil through its breathing system is amplified. It is therefore a regulation that the breather output should be routed into a translucent catch tank of at least two litre capacity. Caterham can supply an additional screen washer bottle and bracket for this purpose.

### 2.9 Headrest

It is a requirement that a head restraint should be attached firmly to prevent the driver's head moving back in an accident. Caterham can supply adjustable head restraint for all FIA rollover bars that comply with RACMSA regulations.

### 2.10 Ignition Switch

The ignition switch should be clearly marked with an arrow indicating the "OFF" direction. A suitable sticker affixed to the dashboard above the switch will suffice.

## 2.11 Lights

To prevent glass getting on the track in the event of an accident, all glass lamp lenses should be taped over. The only glass lenses on a Caterham are the headlights and reversing lights, so it will not be mandatory to tape over rear lights, indicators etc. although many people do so.

## 2.11 750 Motor Club Road Going Sports Car Championship

Generally a car prepared for the Caterham Cars BRSCC series will also be eligible for this championship. However, the 750 Motor Club permit a car to be run in a more modified form and we suggest you study both sets of regulations carefully.

## 2.12 RAC Blue Book

All these requirements are contained in the Blue Book which is updated annually. Sections Q, QS, QA, QG 9 (Production Sports Car Formula) and relevant sections of QM should be referred to.

This book also gives details of event programmes, circuit addresses etc and is sent automatically to licence holders.

## 6.3 Preparation for Hillclimbs and Sprints

3.1 A car prepared for racing will be fully eligible for hillclimbs and sprints provided that the vertical strut specified in 16.3.3 is fitted.

3.2 Many of the items in section 16.2 are not compulsory for hillclimbs and sprints, however all are recommended. Please check the regulations for the events you are entering.

3.3 A vertical timing strut must be fitted to the nosecone of the vehicle which must be opaque and non-reflecting. Viewed from the side it must measure 10 inches high and two inches wide and be fitted in a position so that its base is eight inches from the ground and its top 18 inches from the ground.

An ideal material for this is sheet aluminium, painted matt black and this can easily be attached to one of the front numberplate mountings.

## 16.4 Performance Options

Caterham Sevens can be specified with optional features that improve their track performance without compromising their day to day use on the road. This manual does not cover engine tuning since this is very much a matter of budget, taste and class

eligibility. Caterham do not provide non standard engine specifications nor do they modify engines for customers, but they can put customers in contact with specialists if requested.

#### 4.1 Lowered and Up-rated Springs

These are available for live axle cars only and sharpen up the handling in exchange for a stiffer ride. Definitely recommended for competition purposes, they can be specified instead of standard items when ordering kits. At present lowered and up-rated springs are not available for De Dion cars, with the exception of 300lb front springs.

#### 4.2 Adjustable Platform Shock Absorbers

On live axle cars these dampers which are manufactured by Spax are a direct swap for the standard items and have identical characteristics except that they have adjustable spring platforms which allow the ride height to be altered. Where competition springs and lower than standard profile tyres are fitted, these allow normal ride height to be regained for road use whilst deriving handling benefits from low ride height on the track. These are available from Caterham or can be incorporated within the kits at extra cost. (see 14.9 for further details)

The Bilstein dampers used on De Dion cars can have the ride height adjusted by moving the spring platform and retaining circlip. Alternatively the special units developed for the Vauxhall powered race series will fit, they are differently rated and require different springs. Refer to Caterham Cars for details.

#### 4.3 Axle Baffling Live Axle Only

Under racing conditions Ital/Marina rear axles can suffer oil surge due to being subjected to G forces not anticipated by their designers. To overcome this problem we fit special baffling inside the axle and ideally this should be done whilst the axle is being modified initially. If you intend to use your car for competition purposes we strongly suggest that you have this done in order to avoid premature wear and possible failure.

#### 4.4 Competition Driving Seat

The standard seats are not ideally suited to racing as they neither allow for 6 point harnesses nor for additional underfloor honeycomb protection and, with taller drivers, allow the drivers head to be insufficiently below the top of the roll-over bar.

Caterham Cars can supply a fibreglass racing seat with provision for 6 point harnesses. Once fitted, the position of this seat cannot be altered. Alternatively, Oxted Trimming can manufacture bespoke seats for you - contact Will Marinner on 01883 712112



#### 4.5 Dry Sump Oil System

For serious competition use, particularly where it is intended to use slick racing tyres, a dry sump kit for Ford engines is available under part number DSO2 which contains all the parts needed to convert a Ford Kent O.H.V. or Cosworth BDR or BDA engines for installation in a Seven. This is a specialist job however so we recommend that you seek advice from your engine builder or Caterham Cars. A dry sump system is also available for Vauxhall engines (see section 10A.2)

#### 4.6 Adjustable Camber/Castor De Dion Only

De Dion cars incorporate the facility to adjust both camber and castor in order to fine tune the car's handling for competition purposes. Generally increased negative camber will improve the car's high speed stability and turn in, though settings are quite critical and depend upon such factors as tyre size and type. We recommend seeking advice from Caterham or Hyperion Motorsport before changing the standard settings, and you should be aware that camber and castor changes will also affect the tracking.

#### 4.7 Competition Petrol Tank

An FIA approved bag tank, as fitted to Caterham Vauxhall racing cars, is available from Caterham Cars. This tank is fitted with an in-boot filler and maximises safety in a rear end impact.

### 16.5 Additional Maintenance

Vehicles used for competition purposes are subjected to stresses far in excess of those normally encountered in normal road use. It is very important that not only should the normal maintenance schedules be strictly observed but that a further thorough check be carried out before each event. This is important both from a safety point of view and to be competitive, a car that does not finish the course will not win anything!

#### 5.1 Suggested Pre Race Check

##### Chassis

- a) Check tyre pressures, correct wheel tightness, and tyre condition. For racing purposes it is often advisable to increase pressures over the normal recommended road settings, though this practice is dependant on the size and type of tyre used.
- B) Check brake system, including pad and shoe wear, pedal travel and fluid level. Live axled cars may need frequent adjustment.
- C) Check front wheel bearings and adjust if necessary.

- D) Check tightness of all suspension and steering components paying particular attention to the rear 'A' frame bushes, these do loosen under the stresses of competition.
- E) Check the front wheel alignment, particularly if you have bounced hard over kerbs or suffered an off track excursion in your previous event.
- F) Carry out a general check on the whole car looking for items that have worked loose or been bent or otherwise damaged. In particular check the operation of all controls.

### Engine

- G) Check engine oil level and top up if necessary. If the engine has blown oil into its catch tank do not re-use it, but ensure the tank is empty before presenting the car to a scrutineer. If the engine has been over filled, the chances are that the excess will be blown into the catch tank so a small amount after a race is no concern.
- H) Check security of engine ancillaries and manifolds, tightening anything that may have worked loose. Do not however risk over tightening bolts 'to be on the safe side', always use a good quality torque wrench. In particular ensure that the alternator drive belt is correctly adjusted since the engine will be sustaining higher revs than normal and the water pump will need to be operating properly to avoid overheating.
- I) Check the cooling system for leaks, topping up as necessary.
- J) Check the adjustment of both clutch and throttle cables, remembering that a stretched throttle cable may no longer be opening the carburettor chokes fully with a detrimental effect on performance.
- K) The gearbox and rear axle/differential will not normally require topping up but check underneath the car for any signs of oil leakage.

### Safety

- L) Check security and adjustment of your safety harness, replacing it if there are any signs of cuts or fraying. Never re-use a seat belt if it has been stretched by any kind of impact.
- M) Check that the pressure indicator on your fire extinguisher (if fitted) shows it to be ready for action and ensure that the safety release pin is removed before the car is taken onto the track.

## 5.2 Accident Damage

In the event that your car sustains accident damage, hopefully an unlikely event, it is vitally important that it is properly repaired. Impact damage to any front corner of the car is likely to overstress safety critical components which are the stub axle, steering arm, upright, trunnion and top link. Wishbones should be replaced if there is any evidence of distortion, not straightened.

Although damage to these components may not be visually evident components may well have been overstressed leading to a later failure. When in doubt always replace with new parts.

If the chassis itself has been distorted, proper repair can only be carried out on the correct jig. Please contact Caterham Cars for assistance, if the chassis is repaired in any way twisted it will neither handle properly nor be safe