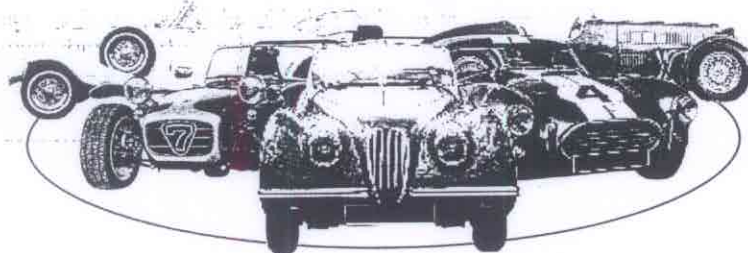


kit car

SVA GUIDE



INTRODUCING THE TEST

As we have pointed out before, the Single Vehicle Approval scheme is not being put in place to make life difficult for kit manufacturers or their customers. It is a piece of legislation which will make kitcars and other specialist vehicles, safer for the occupants of the car and other road users.

The industry could have suffered badly had it not been for the enlightened approach by the Vehicle Inspectorate and other government departments who have taken enormous trouble to understand the issues involved. They have consulted manufacturers, clubs, the press and the general public in an effort to ensure that any ensuing legislation is fair and effective. You can read the results of their work overleaf.

However, it must be remembered that the legislation does not only involve kitcars, personal imports, specials, short production run vehicles from mainstream manufacturers and others which do not fall into the standard categories covered by type approval are included. Hence some of the rules may seem a little bizarre when looked at from a partisan viewpoint, but taken in the overall context of things, they

make sense.

We must remind you that the situation is a dynamic one and changes are currently taking place. Therefore we cannot say for sure that what you read here will be accurate in detail in a year's, or even a month's time. What we can say is that the core material will remain as it is and that you should be aware of this in order to build your car in such a way that it will pass the test.

Changes which are almost certain to take place include an increased area of exemption in the shadow of the steering wheel giving more latitude for fitting instruments and switches which do not comply with radius requirements. Hexagon wheelnuts will probably be allowed to protrude up to 30mm outside the bodywork. Any object inside the wheel rim will be exempt minimum radius

requirements, and sharp edges on front suspension units which face towards the rear of the car are likely to be made exempt.

The obligatory markings for lights is likely to change making it easier to comply. It is also very likely that there will be changes to seatbelt parking requirements, tyre marking and signal lamp marking. A likely important change is that emission figures will apply to the date the engine was manufactured. By and large, the changes make it easier for the kitcar builder to comply, rather than more difficult. Whatever the case, we will keep you informed.

If you are building a kitcar, please take time to study the regulations and try to understand the philosophy and the intentions of the SVA scheme as well as the detail of the test procedures themselves.

By taking a positive approach and building the car to meet the criteria of the test, rather than trying to find ways around the rules, you will not only end up with a safer car but it will road legal and have a better resale value because of it.

When you have studied the requirements of SVA it will become apparent that by and large the criteria are common sense. If you have never been involved in an accident it may be difficult to visualise yourself in that situation, but every day people are killed and maimed on the roads. No one in their right minds will want to build a car with seat belts that don't work properly, or a steering column that spears the driver through the chest in a frontal impact, or have front wings that have edges like razors which are ideally placed to slice off a pedestrian's leg.

There are two levels of responsibility when considering the construction of a home-built car. In the first instance it is incumbent on the manufacturer of the kit to design it so that it can be built in such a

way as to pass a Single Vehicle Approval test. However, one of the attractions of building a kitcar is that the individual can put his/her own stamp on it. So most companies deliberately leave the details of the build open to interpretation. Consequently you can hardly blame the manufacturer if you fit a walnut dashboard that looks the business but fails to pass the test because you haven't put a 19mm radius on the bottom edge.

Most kitcar manufacturers are responsible people who would not produce and sell a kit which cannot be built into a car that will pass the test. However, there is bound to be the odd rogue who either doesn't know the rules or who deliberately flouts them. How do you tell which is which?

The first thing to do is to familiarise yourself with the regulations printed here. Armed with a tape measure and couple of cardboard templates you check things like upper seat belt mounting point height, headlamp height, field of vision and so on.

It's also pretty easy to spot sharp edges and projections and to check the radius. By knowing what to look for you can pretty well tell if the manufacturer has done his stuff or not.

By all means ask if an example of the particular model in which you are interested has passed the test and if it has, there will be a MAC for you to see as proof that you are not being led up the garden path. If a company does have a MAC it means that at least the car is capable of being built to that standard. However, no MAC doesn't necessarily mean the car can't be built to pass the SVA. There could be any number of legitimate reasons why the company haven't yet got a pass certificate - many are waiting until all the proposed changes have been agreed and published before firming up on the detail. At least if you know the broad outlines of the scheme, you will be able to assess whether the kit is capable of being built to the right standard which will ensure a pass.



ANTHONY STAFFORD VEHICLE COMPONENTS

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Halogen with or without side
£90 pair + £6 pair p&p

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Halogen with Side
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REVERSING LIGHT 1253

Chrome. Also available
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REVERSING OR REAR FOG LAMP

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3" LIGHTS L691

Stop/Tail, Indicator & Reversing
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3" LIGHTS

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LUCAS L488

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Indicator & Side
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PEDESTAL INDICATOR LIGHT L874

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NUMBER PLATE LIGHT

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Heater water valve & cable
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Spare key £2 extra

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£15 + £2 p&p

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SWITCH

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Two speed wiper with park £18 each
+ £2 p&p

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WHEEL BOX

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WIPER RACKS

NOTE: ALL LIGHTS SUPPLIED WITH BULBS

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ISSUE 1 1998

THE TEST IN FULL

Let's take a look now, in detail, at the headings covered in the overview. This examination is not intended to go into precise legal definitions or be a completely authoritative work on the subject. It is our interpretation, to the best of our knowledge, on the test procedure and how it will affect the kit car builder. Hopefully we will cover all the areas of interest and exclude those that are aimed at commercials, motor caravans etc.

As with all test procedures, they are subject to periodic change and up dating. This will definitely be the case with SVA testing for the MAC certificate.

1. Anti-theft

- **Effective operation will be tested and checks to ensure compliance with the rules on the interaction of brakes and steering will be carried out**

Vehicles must have an anti-theft device fitted. It can be mechanical, such as a steering wheel lock, or electrical, providing it's in addition to the ignition switch. In the interests of safety, you must not be able to start the engine with the device set or engage it with the engine running. Neither must it act on the braking or steering.

Analysis:

This device can be one of the proprietary engine immobiliser systems, a steering wheel lock as fitted to production cars, or as simple as a battery cut out switch, with removable key, fitted to the main feed. Care would need to be taken with cut-outs as some engine management systems require a constant feed.

2. Defrost/Demist

- **Correct operation of the of the system, including effective fan assistance will be checked**

Any vehicle fitted with a full, non-folding screen must have a system capable of defrosting and demisting the windscreen. The fan assistance must be effective in severe weather.

Analysis:

This is really a case of ensuring that your system is up to the job under the severest of conditions. Consideration must be given to allowing for the maximum air flow and heat being delivered to the screen.

An annex is included in this section regarding the determination of windscreen 'horizontal plane'.

It is a means of evaluating the difference between an item that is classed as a windscreen as opposed to a wind deflector that the driver looks over. This annex would probably concern the manufacturer more than the builder.

3. Wipers

- **The test procedure looks at the operation of the wiper system and whether it meets requirements regarding the security, the frequency of sweep and the blade park positions.**

When in operation, the wiper system should provide the driver with an adequate field of view forward, o/s and r/s.

The system will be tested wet and the wipers must have one or more speeds, one of which must exceed 45 cycles/min. A cycle is considered to be one full forward and return sweep of the screen. The wipers must also park automatically outside of the drivers normal field of view. The system may be tested with the engine running.

Analysis:

Can't see too many problems here, provided the wiper throws are correct and they park out of the line of sight. With Lucas wiper systems a number of wiper motor quadrants are available that give different throws.

Washers

- **The test involves ensuring adequate liquid is squirted onto the screen, the reservoir capacity and the pressure test**

The washer system should have a capacity in excess of 1 litre and when used, clear the windscreen with the wipers working. With electric pumps, the system must be able to withstand plugged jets for between 3 and five seconds.

Hand and foot pumps are also discussed but I cannot see these being used in kit cars.

Analysis:

Watch the size of your reservoir, (a lot of old washer bottles are under 1ltr) and ensure the system withstands the pressure test. Very simple this one.

4. Seats and anchorages

- This is a visual assessment of the security and strength of the seat mounting points, and the positions of the tilt and adjustment levers/handles

Seats must be securely bolted down to the chassis or other strong points of the vehicle structure. If not attached to the chassis or non-metallic floor pan, the fixing points must be arranged so that the load is spread adequately. This can be achieved by moulding-in plates or using other means to stiffen the structure and distribute the load

The tilt mechanism and seat back adjustment must be fitted with automatic locking systems that operate in all normal positions.

Analysis:

This is one of the areas where the kit supplier should be able to provide seats and attachment points that meet the test requirements. If you are using after-market seats, or utilising production seats then you will have to pay close attention to the above requirements and the following section on seat belts.

5. Seat belts and anchorages

- Because of the obvious safety implications these tests are quite comprehensive and ensure that the correct number of seat belts are fitted

and that the mounting points are of adequate strength. Belt security, approval markings and characteristics, the operation of the locking and retractor mechanism and belt storage are all checked. Also, a check for sharp edges which may damage the belts is carried out. With respect to anchorage points, their location, position of the belt on the body, strength, height and position are all tested.

Sorry, but this is a long and important section in the test procedure, so here goes;

Each of the seating positions is to be fitted with the correct number of anchorage points and they must meet the minimum requirements for the type of belt fitted.

The front seats must have a minimum of three anchorage points.

The rear seats must also have three points, except where there is NO structure to which an upper anchorage can be fitted. In this instance two point fittings are permitted. (i.e. lap belts)

All the anchorage points, including those with belts not fitted, will be assessed for their load bearing capabilities. This means that the anchorage points themselves, the surrounding structure and the way the loads are dissipated and the materials involved, will be taken into account - this is a visual inspection, but if there is any doubt regarding strength, then documentary evidence may be required of successful testing on this or similar structures.

Each belt must be secured to the vehicle structure, or where it is integral with the seat by a fixing of adequate strength. The belt must be removable without causing damage to the anchorage. Seat belts must bear one of the following approval marks 'E' or 'e'. British Standard marking for passive belt systems BSAU183:1983. For full harness belts (one lap and two shoulder straps) BS3254:1960 or BS3254 Part 1 1988

Seat belt table - Extracted from SVA Inspection Manual

Vehicle Description - Effective Date	Seat Position		
	Driver's and "Specified Front Passenger's" Seat (See Note 1)	Centre Front Seat	Forward Facing Rear Seats
1. Passenger vehicles and dual purpose vehicles with not more than 8 passenger seats.	Prior to 1 April 1987	No requirement	No requirement
	From 1 April 1987	3 point belt or lap belt (See Notes 3 and 8)	3 point belt or a lap belt on all seats (See Note 3)

NOTE: "EFFECTIVE DATE"

In the case of an Amateur Built vehicle:-

- with an integral chassis-body - the date of manufacture of the chassis-body
- having a separate chassis - the date of manufacture of the body or chassis whichever is the earlier.

In any other case

- The date of manufacture of the vehicle.

NOTE 1: The "specified front passenger seat" requiring a seat belt is the seat which is,

- foremost in the vehicle, and
- furthest from the driver's seat

unless there is a fixed partition separating the passenger seat from a space in front of it which is alongside the driver's seat, eg certain types of taxis, buses, etc.

NOTE 2: '3 point belt' means a seat belt which,

- restrains the upper and lower parts of the torso
- includes a lap belt
- is anchored at not less than three points, and
- is designed for use by an adult

NOTE 3: Acceptable alternatives to any of the seat belt types listed are

- an adult harness belt comprising a lap belt and shoulder straps
- a passive seat belt

NOTE 8: A three point belt is required where, due to the seat position in relation to the windscreen, an upper anchorage is required (see Item 1, Note 1 of Procedure and Standards)

The webbing must be at least 46mm wide (33mm in the case of harness belts) and all components that contact the belt are to be plated or coated. Buckles must be capable of being released with one hand; static belts must be accessible, convenient to use and be able to be tightened with one hand.

Inertia reel belts should lock on deceleration or when pulled out quickly and the webbing retract correctly (although some help may be given)

All belts to be clear of any sharp or abrasive edges. Each lap, passive or three point belt should have the facility for safe and convenient storage when not in use, including rear lap belts.

When sitting in each seat in turn, and with the seat belt adjusted correctly, the belt positions will be checked for the effective belt anchorage points in relation to the seated body position. In the case of adjustable seats, the check will be made with the seat right back with the backrest in the 'normal driving position' i.e. not more than 25 deg. from vertical

Analysis:

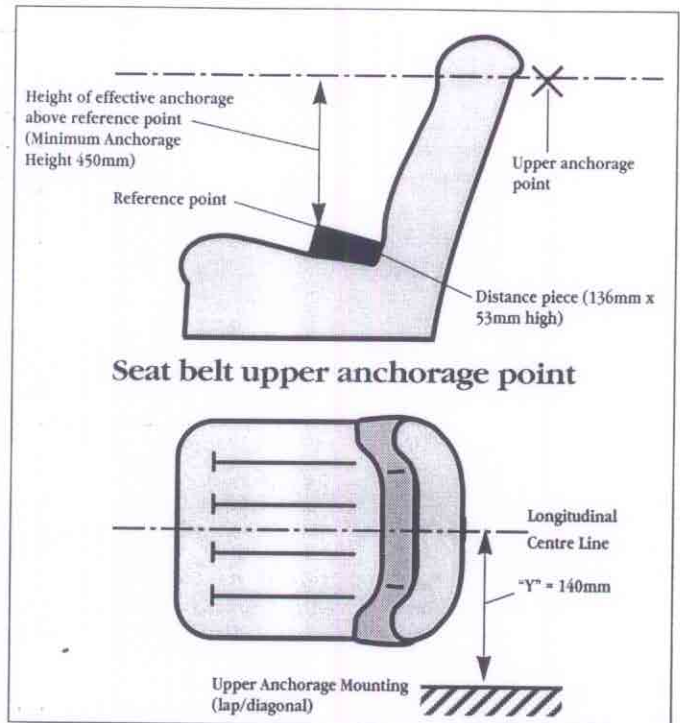
This is heavy stuff. But, don't panic! your kit supplier should have done all the work in this very important area and have got it right, to ensure that their vehicles are capable of passing these tests. So, ask them about it!

This section goes into great detail as to the exact requirements of anchorage points and their attachment within specific areas and is beyond the scope of this article. Builders who are not building from kits will have to study this aspect of the regulations very closely.

The regulations refer to the 'effective belt anchorage'. This is the actual anchorage point to the vehicle unless a change of direction of the belt to the wearer is produced by a fixed intermediate device, for example, a belt guide fitted to the upper part of a seat back. This is of interest to a lot of builders as it is referring to open cars where there is no 'B' post on which to attach the upper belt anchorage. The upper fixing can be replaced by a belt guide at the specified minimum height of 450mm and retains the belt at a minimum of 140mm when measured from the centreline of the seat back. This then becomes the 'effective point'. The mounting to the seat back should be fixed to the seat frame, which in turn must be capable of withstanding the possible loads applied to it. Seat manufacturers will have to do some development in this respect, to provide seats suitable for this mounting requirement in open cars. The seat and belt fitting instructions will also have to be very specific to enable the builder to mount them correctly.

A point to watch is the fixings, these should be at least 11mm (7/16") diameter and of 8.8 grade. These anchorage bolts must be fitted into a 'fixed' threaded hole or captive nut, this is a fairly standard production specification although the bolts may not, actually, be marked. The belt anchorage bolts should also be fitted with the appropriate 'top hat' spacers and wavy washers to ensure that the belts swivel correctly if required to.

A last word on belt stowage. Front and rear inertia reel belts should pose no problems, however, a lot of sports cars will be limited to lap belts in the rear. Surprisingly these are also subject to the stowage requirement! So when buying rear lap belts ensure that they have some sort of device or location button with them to do this, as currently, most do not.



6. Interior fittings

- This is another important area and gauges will be used to check for projections and sharp edges of instruments, knobs and switches, instrument panel, gear lever, handbrake, roof projections and other areas and object which could cause injury in the event of an accident.

This section on projections is one that would be very easy on which to fall down, so attention to detail is required. The area covered is referred to as the 'specified zone', this extends from the rear passenger seat back rest to the front-most interior of the car and down to the lowest part of the top of the seat cushion.

An area directly in front of the steering wheel and extending to the nearest internal body side is not included within the 'specified zone'. The screen side pillars are also excluded from this zone, which I find amazing, given this is an area that, conceivably, your head could crash into in a frontal impact

A visual check of the 'specified zone' will be made, for interior fittings and design features that can be contacted by a 165mm dia. sphere for dangerous roughness or sharp edges.

Definition: 'A sharp edge means an edge of a ridged material having a radius of curvature of less than 2.5mm, except in the case of a projection from a panel which is less than 3.2mm. In this case the minimum radius of curvature shall not be more than half its width and its edges are blunted'

Within the 'specified area' switches and knobs will be checked for protrusion of no more than 9.5mm and contactable by a 165mm dia. sphere. The knobs may project further, provided that they retract or detach when subject to an impact of 40kgf.

The lower edge of the dash / instrument panel must have a radius of not less than 19mm. This may be 5mm if covered by a non-rigid material and a specification is given in the manual to define this.

If the car is more than a two seater, the rear of the front seats must be covered with a non-rigid material and have a radius of curvature of not less than 5mm.

The handbrake will be checked in the released position and the gear lever in all forward gears, to ensure that any surface contactable with a 165mm sphere does not have a radius of less than 3.2mm. This requirement relating to the handbrake does not apply if it is mounted under the dash and in the released position there is no chance of it being contacted by the sphere. Shelves and similar items will be checked for protruding edges and must be at least 25mm high with a radius of curvature not less than 3.2mm. These are also to be covered by a non-rigid material.

The roof lining will be examined and if necessary tested with the 165mm dia. sphere for projections. The roof area will be checked for sticks or ribs made of ridged material that project down more than 19mm, with the exception of the screen header rail or side window frames.

Analysis:

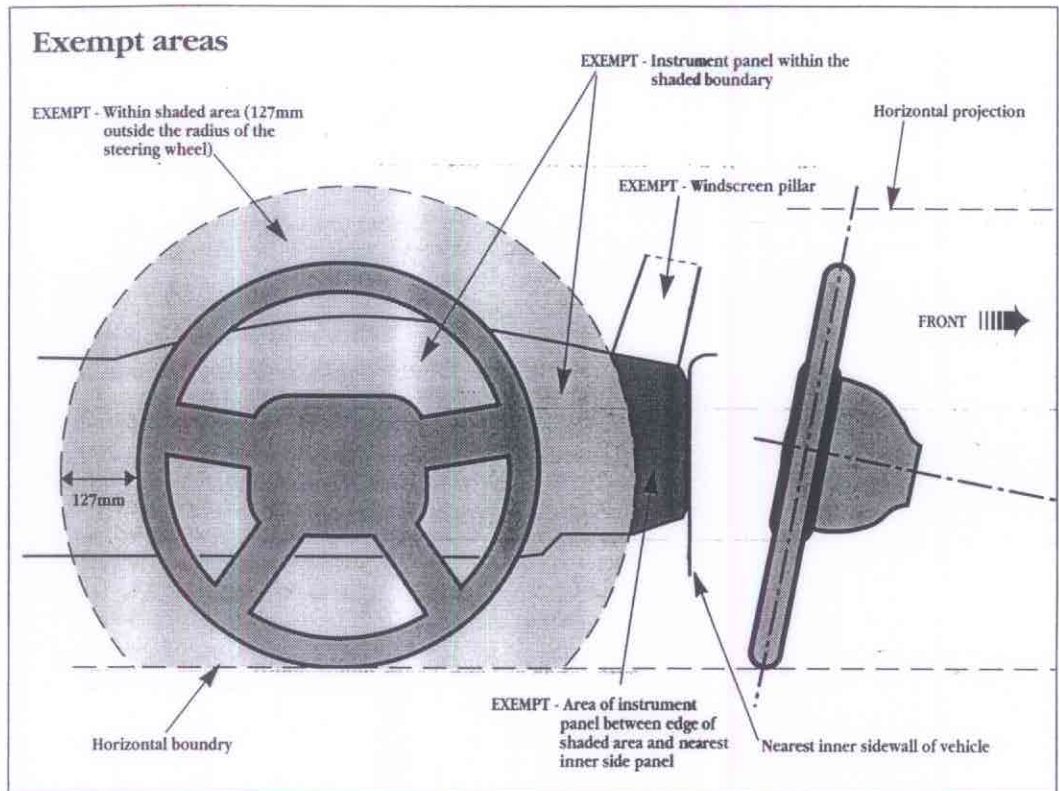
Actually this is not as bad as it looks, provided you follow the guidelines, the exemption area around the steering wheel is quite generous and traditional style switches can still be retained outside of it, providing that they are fitted to a panel that is certified, or can be demonstrated, retractable. You will have to watch the radius of instrument bezels, glove box handles etc. for example most round Smiths' type gauges would fail the test without being recessed into the dash enough to fall outside the test criteria of 3.2mm maximum projection.

Handbrake levers and gear knobs will have to be checked closely for radius of curvature. An item

that may not be obvious, is the handbrake ratchet or mounting that could be covered by a gaiter, but still falls within the test area. This mechanism may require some form of cover under the gaiter to protect it.

Some really good news for soft tops is that they are exempt from item 7, regarding projections of hood sticks etc. This section is really referring to the old fashion style of metal headlining bows. A roll over bar would also be exempt.

Convertibles will be tested as presented, which means that they may or may not have the hood up. One point to watch may be the projection of front header rail securing devices, particularly on traditional style cars.



7. Radio suppression

- A visual check will be made to ensure that HT leads are suppressed and marked as such.

Analysis:

Very easy this one. The regulations actually state that the H T leads should be suppressed and marked as such, although the amateur builder does not have to comply with the markings requirement. Generally speaking it is common sense to fit a good set of suppressed leads that are marked, combined with coil and alternator suppressers if appropriate. Your local car radio store would be able to advise you on this subject.

8. Glazing

- An instrument is used to determine the windscreen horizontal plane and the forward visibility is checked. A visual inspection is made to ensure security of the glass, markings and opacity

When seated in the driving position, the driver should have a full view of the road ahead, o/s and n/s. The lower edge of the screen must not be above the 'windscreen horizontal plane' as indicated in the manual.

Side screens, when fitted, will be checked for security. These are permitted to be detachable, but must be secured for normal use and such that they cannot interfere with the control of the vehicle. They are to be made of safety glass to a recognised standard and marked as such. All other windows including glass sun roofs must also be marked or be of an equivalent standard or safety glazing.



Tilt and turn side windows, as in Lancia Stratos replicas, are OK providing they are made from material that does not fly into fragments likely to cause severe cuts

Recognised markings are as follows;

British Standard:	BS857 BS5282 BSAU178
ECE	Regulation 43
EEC	Directive 92/22

American markings are also covered, but not listed here. All screens must not have an opacity which restricts the light less than 70%.

Analysis:

There should be little trouble with the glazing aspect, as all reputable kit suppliers provide glass that meets these standards. Unusual or odd side windows, such as tilt and turn i.e. Lancia Stratos are also acceptable provided the material used is classed as 'safety glazing.'

The definition of safety glazing given is 'Material (other than glass) which is so constructed or treated that if fractured it does not fly into fragments likely to cause severe cuts'. There is no marking requirement for safety glazing.

Examples of 'E' markings;

e11
E11 43R-002439

We can see a major problem for people using 'high rise' superchargers on large V8's as they would probably fail item 1, 'Forward visibility'

9.1 Lighting/signalling (obligatory)

- Visual checks will be made for correct operation and colours of lamps, correct markings, secure fitment, the correct number of lamps and their brightness. Measurements will be taken to ensure correct angles of visibility, the positioning of lamps and the frequency of flashing in the case of indicators. There is a requirement for headlamp single switch operation.

The vehicle is not to be fitted with any light capable of showing red to the front. At the rear the lights should be red only, except amber light from direction indicators and white light from reverse, number plate and interior lamps. The lamps will be checked for correct markings, correct number of lamps, colour, positions and angles of visibility.

It is worth noting the exact criteria here:

'Lamp/reflector lateral position is measured from the extreme outer edges of the vehicle (disregarding tyres, mirrors, lamps and reflectors) and vertical position from the ground; in either case to the edge of the illuminated area (reflective surface in the case of a reflector) other than in the case of a dip beam headlamp where the minimum height measurement is from the ground to the apparent trace of the beam cut-off on the lens'.

All front and rear position and number plate lights must turn off from one switch.

The headlamps must be a matched pair and not more than two dip beam headlamps are permitted.

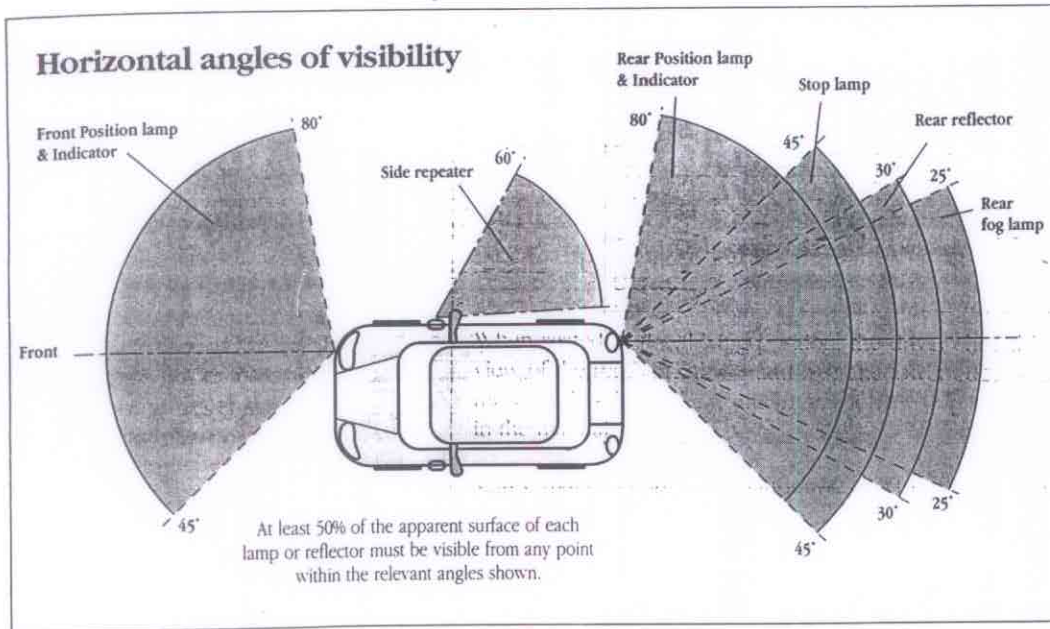
The rear fog light must have a visible warning light and must not be wired into the brake light circuit.

Both sides of the indicators must flash constantly at a rate of between 60 and 120 flashes per minute. They should also have a 'tell tale' warning device (light or audible). The hazard lights must work with ignition on and off and be provided with a warning device. (This may be the same as the trafficator warning lights)

No lamp should be able to be moved when the vehicle is in motion. (Old fashion American, 'Highway Patrol' screen pillar mounted spot lights are a good example of this.)

Analysis:

The lighting requirements are those covered by the 'Vehicle Lighting Regulations'. With most kits, the instruction manual will give a clear indication where the lights are to be fitted.



included as the best explanation of the test procedure.

The vehicle should be fitted with at least, the minimum obligatory mirrors. That is to say, one interior and one o/s mirror (for r/h/d). If the minimum angle of vision required cannot be met from an interior mirror then a n/s mirror must also be fitted. An interior mirror must be fitted other than if it would provide no rearward vision i.e. obscured by a partition (as in many vans).

All mirrors must carry an acceptable European approval mark, or display the equivalent characteristics of one.

9.2 Lighting / signalling (optional)

- Again, the operation, colour, number, markings and position of these lamps are covered by the Vehicle Lighting Regulations and they will be checked accordingly against the criteria given in section 9.1.

Analysis:

As given at the end of Section 9.1

9.3 Aim of headlamps

- This check will be made using standard aim testing equipment, without the use of mask or beam converters

Analysis:

No problem, provided you use correctly marked lights within the specified locations and that they are aligned. A lot of section 9.3 concerns American headlights.

10. Mirrors

- Field of view tests will be carried out in a specially marked area. Visual tests will also be carried out on security, marking and adjustability. The field of view diagram is

These are; 'E' or 'e' with 1 (interior mirror) and 111 (exterior mirror) 'Equivalent characteristics' means that the mirror surface is to be enclosed in a protective housing which must have radiuses of not less than 2.5mm, except for fixing holes or recesses less than 12mm wide and blunted. Exterior mirrors must turn inwards towards the vehicle under a load of 10kg - Basically this is the requirement for any mirror on a modern car.

The exception is where the mirror falls within the plan form of a car, as it may well do on a traditional roadster design. In this case the minimum size requirement only is applied and not the requirement to swing back and return to its original position without further adjustment.

Minimum sizes are, 40mm high X 80mm in length for an interior mirror and 40mm high X 70mm in length for the exterior. With the exterior mirror you must also be able to get a vertical measurement of 70mm somewhere along the length. (For example; if you cut a 40 X 70mm piece of card and offered it up to a round mirror and none of the corners touched, it can be seen that you would easily achieve the vertical 70mm requirement.)

The interior mirror must be adjustable from the normal driving position.

The driver's side exterior mirror must be able to be adjusted from inside with the door closed, or locked in position through an open window. However, once locked, it must be capable of returning to its original position if knocked.

Interior mirrors are allowed an obstruction of up to 15%, (for head rests, rear wipers etc.).

Exterior mirrors are allowed an obstruction of up to 10%, (bodywork, handles, indicators etc.)

Analysis:

For modern designs we cannot see any problem in satisfying the requirements and mirrors are readily available. For builders of replicas or character designs this could be quite a tricky area and we think that the mirror suppliers and

manufactures are going to have to come up with some new designs that fulfil the criteria, but do not spoil the look of the cars to which they are fitted.

Interior mirror location may also be difficult to achieve on this style of car. The field of vision test is going to be very hard to work out at home and what we would suggest is standing your daily Eurobox in a location and noting what can be seen in the mirrors. Then place your kit car on the same spot and apply the test to that, it is reasonable to assume that the requirement for the kit is going to be near that which is attainable from the Eurobox mirrors. The best advice is to follow the kit manufactures lead and use the mirrors that they supply, provided they have already been tested.

11. Tyres

- Tyres will be visually tested to ensure that they are correctly marked and are capable of handling the load and speed capability of the vehicle

Analysis:

Very simple, just use the right tyres for the job. Tell your tyre supplier what the tyre is for and what the maximum speed of the vehicle is going to be. Other than that it is just a case of conforming to the normal tyre guidelines.

12. Doors, latches, hinges

- Visual and manual checks will be carried out on latch positions and loading, safety bolt operation (if fitted) interior handle accessibility and aperture cover security

All doors must open and close correctly and securely latch in the closed position. Door handles and controls must be easy to reach and not have any sharp or jagged edges. They are also subject to the 165mm sphere and 2.5mm radius of curvature test.

The tailgate, bonnet and boot etc. must be capable of being securely latched when closed. Driver and passenger door latches must have both intermediate and fully latched positions, unless the door is fitted with a safety bolt and operational warning device (see below). When the doors are latched a visual assessment will be made of each door latch mechanism (in both positions) to see if it is capable of with standing a 30kgf load if it was applied.

Doors that are rearward or top hinged must be fitted with a safety bolt and audible warning device that is activated when the ignition is switched on, but the safety bolts are not engaged.

Analysis:

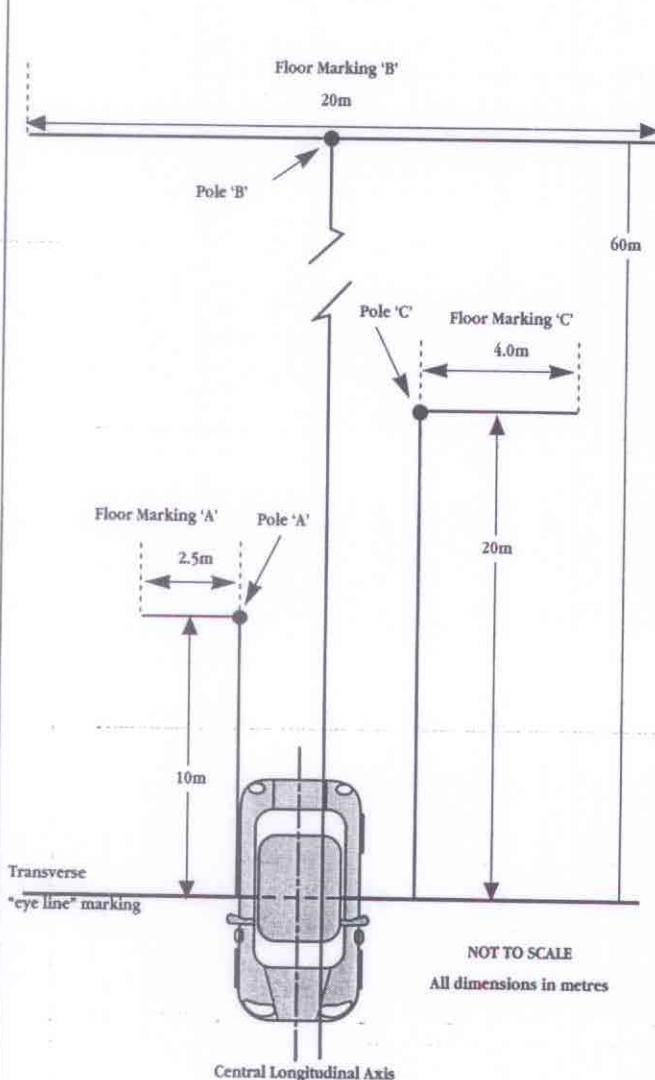
A number of points here, if doors are part of the kit design the manufacturers should provide doors that will pass this test, or advise on how to get them through.

At last the grey area of rearward hinged door has been cleared up. Yes, they are legal provided they are fitted with a safety bolt and audible warning device. Single stage latches are also okay, provided they are fitted with these two safety features. These are sensible requirements, and the criteria are an example of where constructive consultation can be seen to have been at work.

13. Exterior projections

- Like the test for interior projections checks will be made to ensure that

Mirror field of view diagram
Layout of floor markings



radius of curvature, and projection standards are met.

The vehicle will be checked with a cone having a 30 deg. half angle that is set on the floor and used around the car to check for projections of more than 2.5mm radius of curvature. (Excludes exhaust and jacking points.) This establishes what is referred to as the 'floor line'. A side mounted exhaust may provide the contact which determines the floor line.

A visual check is then made, with gauges being used if required, to check all mascots and ornaments that project further than 10mm from the body surface. Mascots are permitted provided they retract when a load of 10kgf is applied and have a radius of curvature greater than 2.5mm. In this case the test sphere is 100mm dia. This test also includes areas such as the rear edge of a bumper. Protrusions of less than 5mm, but of more than 1.5mm are blunted.

Grills are included and the requirement is quite specific; Having gaps of more than 25mm but not more than 40mm have a radius of curvature not less than 1mm. More than 10mm but not more than 25mm the radius must not be less than 0.5mm. Less than 10mm, the requirement is blunted edge only.

Any form of wiper blades and arms need to have blunted edges.

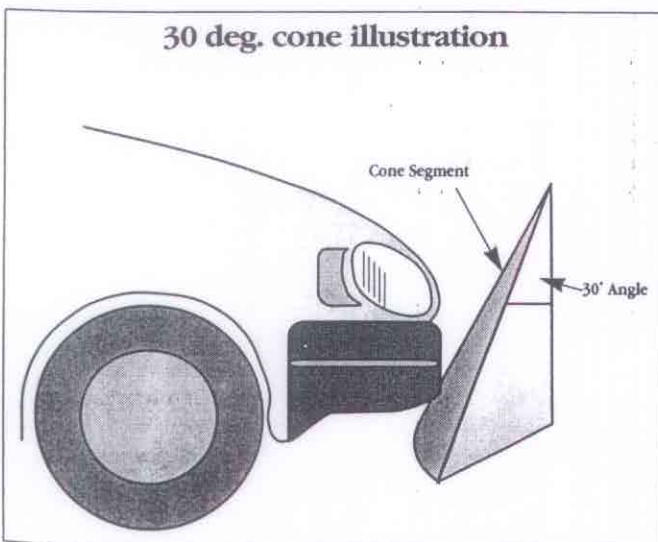
Wheels, wheel nuts, hub caps etc. must not have any sharp or pointed features. This is referring to edges with a radius of curvature less than 2.5mm. This means that if you have a rear or side mounted spare wire wheel, the spoked area has to have some form of rigid cover applied to it!

The wheels must not be fitted with any form of eared spinner and should not have any projections more than 30mm with a curvature of less than 30mm. So, anything other than smooth wheel covers or hub caps are out if they project beyond the vehicles plan form.

Sheet metal edges must have a 180 deg. return edge.

All handles, hinges and filler caps etc. must not project from the surface more than 50mm when within the plan form of the car. (this is useful on traditional cars as it leaves us with a reasonable range of handles) 40mm in all other cases. The open end of a handle (if of that style) must be directed rear wards.

Any windows that open outwards must have no exposed edges and must not project beyond the plan form. (Sorry, no more 2CV's!).



Jacking brackets must not project beyond the floor line by more than 10mm.

Exhaust pipes that project by more than 10mm must have a radius of curvature not less than 2.5mm.

Analysis:

This is a case of the builder really having to watch the projections. Other than the flush-fit type, few of the fuel caps and handles would pass at the moment. Roadster windscreens are another cause for concern as are Cobra wind deflectors which would certainly fail. Don't forget things like bonnet hinges or washer jets if raised, manufacturers can help to a degree by providing mascots etc. that break away when hit. This is another area where we will be looking to the parts suppliers for alternative items to be developed.

14. Protective steering

- **Gauges will be used to check the radius' of the steering wheel and a visual inspection will determine if there is any possibility of entrapment. Air bags are unlikely to be fitted to kitcars for a while yet, but in the event that a bag is fitted then it will be tested. A visual inspection will be carried out to ensure driver protection and adequate column displacement in the event of an accident**

The steering wheel should provide adequate driver protection in normal use and in the event of impact. The surface directed towards the driver must have a radius of curvature of not less than 2.5mm dia. (This would indicate that an alloy wheel would need to be 5mm thick.) The wheel must also be designed so as not to catch the drivers clothing or jewellery. (No thin spokes or holes in the steering wheel)

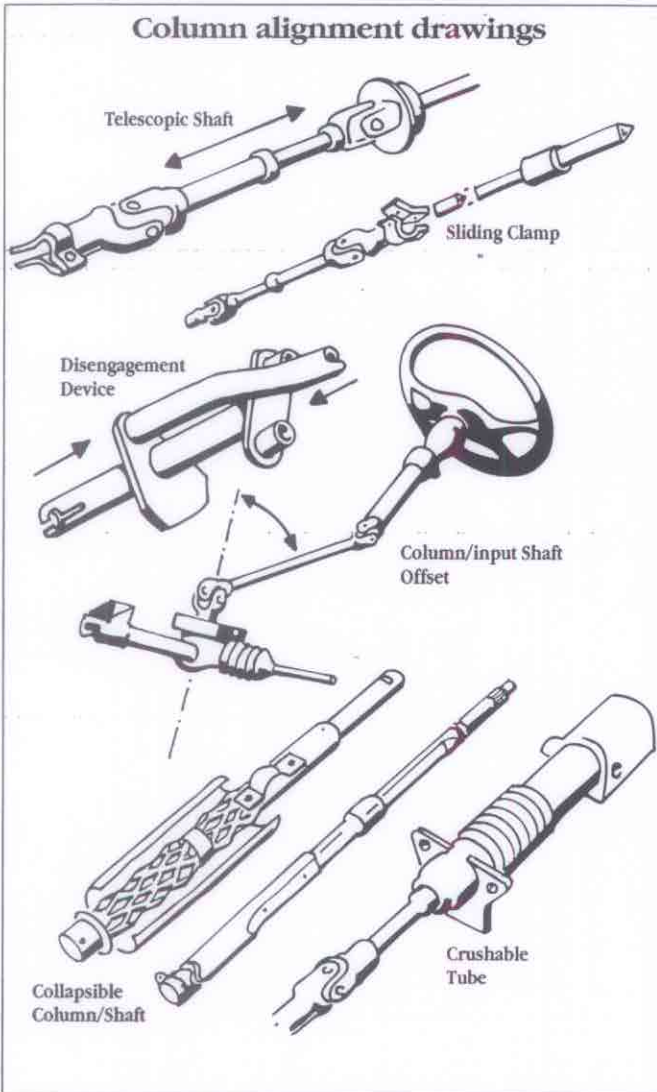
The steering wheel and column must provide a degree of protection to the driver by absorbing driver/wheel impact.

Thankfully, we do not have to worry about air bags at this stage.

Analysis:

For SVA testing, our favourite steering wheels with holes are completely out. The wheel must be very smooth and have some sort of deforming centre i.e. not a hard born push. The good news is that a wheel could be fitted with some form of energy absorbing boss, this would overcome the need to have a collapsing upper column and this is likely to be produced by the specialist steering wheel manufacturers. It is not a problem if your kit uses a known donor column and wheel that already has type approval. Wood rim wheels in general are suspect unless they are specially made and at least one company, Motolita, have designed steering wheels which will comply.

The main thrust of the latter part of this section concerns vehicle design, in relation to the mounting of the steering rack or box. Concern is raised as to whether impact could be transmitted up to the driver in the event of a frontal impact. What they are looking for is that the rack pinion shaft is offset to the line of the upper column and is connected by at least two universal joints, thus the steering linkage would kink rather than transmit an impact. An area like this is the responsibility of the manufacturer, rather than builder, all you have to worry about is fitting the correct SVA acceptable steering wheel and boss. An important section to have knowledge of none the less.



15.1 Vehicle design and construction - general

- A mostly visual inspection will be carried out to determine whether the vehicle design and construction meets general safety requirements. The strength of the main and

subframe structure will be examined together with the suspension security and strength. Steering components and wheels will be assessed for security and strength. The examiner will look for components that foul one another and will determine whether the car can be safely controlled.

Analysis:

A general condition and construction section. Basically, the examiners are looking for condition, strength and suitability of components used. An important point to watch is component fouling; the vehicle will be put on turntables and checked for any chance of contact under normal driving conditions. Included will be: wheels/tyres, rotating transmission/brake components and steering components.

15.2 (fuel system)

- Visual checks will be carried out for security and position of components, leaks and tank cap security. The filler tube size will be measured to ensure that fuel pipe neck from a pump carrying leaded fuel cannot fit into a filler neck of a car fitted with a catalytic converter

(electrical system)

- Again, this is a visual check for component security, insulation, capacity and positioning. Cable security will be examined, together with insulation, correct size and positioning.

Analysis:

Section 15.2 is an area that is totally in the hands of the builder and therefore one where great care must be taken. If your manufacturer supplies component packs for these related items, use them, as time and money will be saved by fitting the correct parts for the job. Routing must be well thought out, with no chance of fouling, and be correctly supported. The regulations state that these systems should be supported at least every 300mm (12") and measures should be taken to prevent chaffing, so grommets and insulation must be used as required. Avoid mounting the fuel and electrical components near a heat source. (Exhaust). Ensure that cable sizes are

right for particular electrical circuits, using the manufacturers wiring loom should ensure that the correct cables and ancillaries are used.

Catalytic converter equipped vehicles should not have a filler neck that will allow entry of a fuel pump nozzle having an external diameter of 23.6mm or more. i.e. it must have the 'unleaded' size of fuel filler neck.

16. Brakes

- **The braking system will be visually examined for security and correct installation. Observation and measurement will be used to check the following areas: component strength; Systems service/security/parking; Pedal operation/anti-slip; Service/park linkage. Accessibility/strength/ function; Security; Reserve travel; Pedal creep; Vacuum operation; Adjustment automatic/manual; Brake fade; Ratchet operation; Linkage compensation/adjustment; Hydraulic/vacuum components operation/ strength/security; Pipes/fouling/positioning; Reservoir level detection; System failure warning light; Anti - lock operation; Efficiency test; Lateral brake ratio; Longitudinal brake ratio**

Before we go into any detail we should consider the basic requirements of the braking system.

Service brakes - must be capable of being operating on all wheels by a single means of operation from the drivers seat with both hands on the wheel. They must also be able to slow the vehicle in forward or reverse.

Secondary brake - Four wheels;

They must be capable of operating via either half of a split circuit service brake on at least two wheels (one on each side) in the event of a service brake failure.

Secondary - Three wheels;

They must be capable of progressive operation via a split circuit service brake system or via the parking brake by the driver, from the driving position (keeping at least one hand on the steering wheel)

Parking - Capable of being operated easily from the driving position and must be able to be applied, both stationary and while moving, on all wheels of at least one axle. Also it must be a mechanical device, independent of the service brake.

Service brake control/mechanical components testing.

The brake pedal must have an anti-slip provision. (This means

pedal rubber - drilled metal pedals are out.) The system will be assessed for design, construction/materials, mountings and ability to withstand the stresses of normal service life.

The braking system must provide heat dissipation without 'brake fade' under all normal driving conditions.

Parking brake control/mechanical components testing.

Design will be assessed, as will construction methods/materials, location and mounting/fixing to the vehicle structure. The system must be able to withstand the stresses of normal service life.

When the parking brake is applied it must not be able to be disengaged by knocking or accidental movement. (This implies that fly off handbrakes are out if they fall into the interior zone contactable by the 165mm sphere).

The linkage must have a means of compensation between the parking brake assemblies and a form of adjustment (manual or automatic) to compensate for wear. (Nothing unusual in this provision.)

Hydraulic and vacuum systems testing.

The start of this section assesses the components fitted and checks that correct unions and joints have been used, the rigours of service life are considered as above.

Some detail is required however, as to the requirements regarding warning systems and this will particularly apply to those using older style components. As stated a dual circuit hydraulic system must be used. All fluid reservoirs must be able to have the fluid level checked without removing the cap and be marked with a permanent minimum level. A red 'low fluid' warning light must be fitted to the dash and this is to have a test facility if the reservoir is not transparent.

Alternatively the hydraulic system may be fitted with a warning device that will warn of failure in either part of the split system. (This would usually take the form of a pressure differential warning switch.)

One warning light is permissible to perform both of the above functions provided both of the criteria are met and that it is marked in a recognised form (labelled)

Anti-lock (ABS) test procedure appears quite normal although the presenter must provide evidence of the manufacturers test sequence.

A roller test is carried out on the braking system and consideration is given to those vehicles where damage could result from this type of testing. i.e. limited slip diff., belt driven transmission etc. If a vehicle incorporates a device that adjusts the front to rear brake ratio, this must be tested in the 'worst case' condition, i.e. maximum rear axle braking. The presenter may be required to adjust any such device during the test.

A decelerometer test will be carried out if the vehicle's characteristics prevent the normal roller brake test from being carried out.

In the final part of the brake test procedure, the service/parking brake efficiency is calculated. This is based on the 'design gross weight' (DGW) as supplied by the manufacturer or if no evidence is available, a calculation is done to produce the 'calculated laden weight'.

Analysis:

Quite a lot to take in and understand in this section. Hopefully, our abbreviation is fairly clear. Some of the criteria does not apply to three wheelers, these have not been covered in detail as a lot of these vehicles will fall under the 410kg unladen weight limit.

If you are working with late model braking systems, most of the problems will have been solved for you, as dual circuits and failure warning devices may well have been fitted to the donor vehicle. With early systems, they will have to be updated. Manufacturers should be able to provide this information for specific kits.

Generally, it would be a good idea to use the complete donor braking system on your car if possible, as this reduces any chance of 'parts incompatibility'. Some cars will have to be set up with brake ratio adjustment devices (proportional valves) and care will have to be taken that these fulfil the test requirements.

17. Noise

- A visual examination will be carried out to determine the security of the exhaust and silencers and the system's serviceability. The noise level will be checked using a Db meter.

Analysis:

The first two items are common sense and require no further comment.

The noise level test is performed outside, in a clear area of hard standing. A Db. meter will be used for the test and the reading must be no more than 101dbA taken at 3,500 rev/min. or 2/3rd engine maximum design speed if it is a slow speed engine. A correctly calibrated rev. counter will be used.

18. Emissions (petrol)

- This is a visual and measured test for exhaust gas emission.

Analysis:

The test will be carried out on a warm engine, both visually and with a calibrated gas analyser. The engine installed will be tested to the relevant standards required for the year of manufacture. This is taken as the age of the actual block used, not the design date. For example, if you have a small block Chevrolet which was designed in the early '50's, but your engine was manufactured in 1989, you would be tested to a stricter emissions level. It is up to the presenter to provide documentary evidence of manufacturing date if required, if none is available then emission levels will be taken as required for vehicles manufactured between 1986 - 1992

19. Emissions (diesel)

- This is a visual and metered test.

Analysis:

Not covered in this article as being of limited interest.

20. Speedometer

- This is a measured test using rolling road equipment to determine the accuracy of the speedometer.

A speedo must be fitted that is capable of indicating MPH at all speeds up to the maximum design speed. So it is no good having a Cortina speedo in a 160mph Cobra. Some documentation may be required to provide evidence of compatibility of drive to head. The vehicle will be tested on rollers and the chart below indicates the accuracy tolerance. Interestingly a fairly large percentage is allowed below true speed, but nothing over.

INDICATED SPEED mph	MIN. TRUE SPEED mph
35	26
40	30
45	35
50	39
55	44
60	48
65	53
70	57

Analysis:

Other than the strangely large 'under indicated speed' permissible, this should cause builders few problems. If you are using a mismatch of parts or different wheel/tyre sizes than standard, then it would be a good idea to consult one of the specialist companies about having the unit re-calibrated.

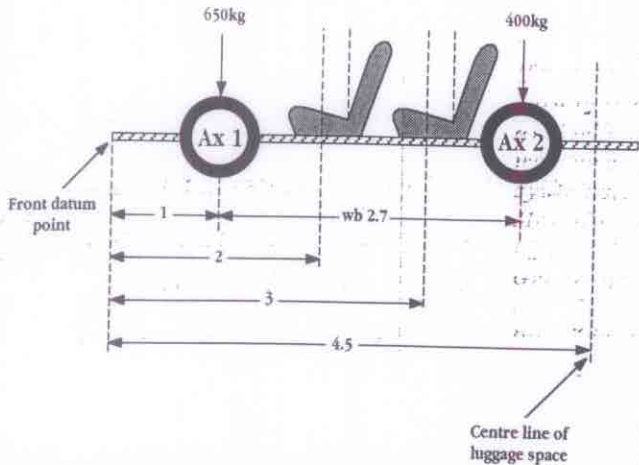
21. Design weights

- The examiner will require the design weight of the vehicle and the front axle weight

Analysis:

As suggested, this section ensures that your vehicle design is capable of carrying the intended maximum loads. The kit manufacturer will (we hope!) have already made these calculations and should have the information available, I've included an example calculation below, as it may be of use to those not building from full kits.

Axle weight and gross weight calculations)



Note: Seat dimensions should be taken as follows:
 An adjustable seat must be in the rearmost position with the datum point 250mm forward of the base of the backrest.
 Or, for all other types, the datum point is to be 200mm forward of the base of the backrest.

Example assuming:

- A) Kerb weight of axle 1 = 650kg & axle 2 = 400kg
- B) Each row consists of two seats
- C) The passenger/driver weight of 75kg per seat distributed.
 - 68kg in each seated position (total 272kg)
 - 7kg in the luggage compartment (total 28kg)

Using the vehicle foremost point as a datum, taking moments on axle 1.

$$\begin{aligned}
 &(2-1) \times (68 \times 2) + (3-1) \times (68 \times 2) + (4.5-1) \times 28 \\
 &= (1 \times 136) + (2 \times 136) + (3.5 \times 28) \\
 &= 136 + 272 + 98 \\
 &= \frac{506}{2.7} = 187.4\text{kg} = \text{additional load on rear axle}
 \end{aligned}$$

Maximum rear axle weight = 187.4kg + kerb weight (400kg)
 = 587kg

Gross weight = kerb weight (1050kg) + passenger weight (300kg)
 = 1350kg

Max. front axle weight = gross weight (1350kg) - rear axle weight (587.4kg)
 = 762kg

CONCLUSIONS

Even if you have passed over the main part of the text with glazed eyes to get to this point, you will be fully aware that there is a considerable amount to get to grips with for the amateur builder in the SVA testing. Please do not be dissuaded from buying a kitcar because of it, in fact it should give the potential buyer more confidence, as it is a good, thorough test procedure and one that is probably long overdue.

The Vehicle Inspectorate has worked diligently to implement the EC Directive in a fair, even handed way, they have listened to, and worked with, manufacturers, specialist bodies and clubs to seek opinion. Numerous concessions have been made to the testing and

the dialogue with the people involved is ongoing.

A pilot scheme is being run at selected Vehicle Inspectorate testing stations until July '97, to test the procedures and give manufacturers the opportunity to have their vehicles tested, then fully discuss the outcome with the examiners involved.

Provided you buy your kit from a reputable, quality manufacturer you should have no trouble in passing the test to gain your MAC. There will probably be an 18 month period of change, where the manufacturers will be working hard to update their vehicles and provided they can give you assurances that their models will be capable of passing the SVA test when required, you should not be put off from ordering now. Please, do ask questions. The level of awareness will vary from company to company, particularly in the first few months leading up to the start of testing, and probably for sometime after. Those pro-active members of the industry will see it as a wonderful opportunity to fully shake off the old, incorrectly, perceived image of kit cars and gain main stream respectability.

Cars with the MAC will be worth more in the second hand market, which must stimulate the market for new kits. Mainstream acceptance would be very good news for the kit builders who wanted to sell their cars. A good example perhaps, would be the person who has built a very nice Cobra, then due to family commitments (poor chap) would like to be able to trade it in at his local Ford dealer for a new Mondeo Estate.

In the future the trend will probably be more towards 'a kit in a box' type of concept, using all of the parts provided by the manufacturer. This is not new and a number of companies already offer this package, others could do it, but do not really advertise the fact, allowing people the opportunity to buy parts as required. This lower initial cost 'buy as you build' policy can still be used, provided, the manufacturer can supply the parts on request or to order. Failure to use the recommended parts would, undoubtedly, compromise the chances of gaining a MAC first time. If you are a traditionalist and wish to build any 'radically altered vehicle' other than from a kit, you must obtain your own copy of the test manual and study it very closely.

Further information

The following two booklets have been published by the Department of Transport.

The Single Vehicle Approval Scheme - A Guide to:

- Personal Importing Vehicles.
- Amateur Built Vehicles
- Very-Low Volume Manufacturing
 (This a good, short introduction to the scheme - get one)

How to Permanently Import your Vehicle into Great Britain Guidance on -

- European and National Type Approval
- Insurance
- Licensing
- Registration
 (An absolute beginners bible for those personally importing a new car)

VEHICLE LIGHTING REGULATIONS

This article first appeared in Pitstop, the Marlin Owners Club magazine. The editor, Bob Copping, has worked his way through the Construction and Use regulations to pick out the points which apply to kitcars and we thank him for allowing us to reproduce it here

The legal requirements for these regulations are all related to the 'date first used' of the vehicle concerned and this would appear to mean that kitcars (throughout this article the term 'kitcars' is used to include 'kit cars' and 'kit conversions' as defined by the DVLC) fall into two categories for dating:

1) Retained donor plate. Lights should comply with regulations in force at the time of original registration

2) Q-plated cars. Lights should comply with regulations current at the time that the car is presented for its first MOT (or later, SVA)

Incidentally, in the opinion of my local Heavy Goods Vehicle Testing Station, no Q-plated car would slip through the (standard MOT) regulations because of indeterminate age. Their opinion is that the MOT inspector should insist on the registration document being produced, and testing should then be conducted using the regulations applicable at the date of first registration. They also feel that emission testing might well be introduced based on the age of the engine, which is fairly easily checked from the engine number.

This would remove the current grey areas - you have been warned.

Lighting regulations fall into two categories:

- 1) Obligatory
- 2) Optional

However both have very specific requirements as to:

- 1) Type of lamp
- 2) Position of lamp
- 3) Angles of visibility
- 4) Methods of switching and wiring
- 5) Dashboard warning lamps

There are all sorts of exclusions for certain types of vehicle, but for the purposes of this article, I will confine my comments to what, for want of a better term, I will call 'motor cars'.

The key dates for legislation are

- The vehicle lighting regulations 1989
- Vehicles first used before April 1, 1986
- Road vehicles lighting (amendment) 1994

There are exemptions for vehicles first used before 1936, but I doubt that anyone is using a donor that old.

From the point of view of safety, and certainty of compliance, it would seem to make sense to build to current legislation on the assumption that the Single Vehicle Approval Scheme will be based on current legislation - the rules for Q-plates certainly will. I intend to focus on the 1989 act (and the 1994 amendment) which should ensure that if you follow these rules your car cannot be rejected at inspection.

It always makes sense, and enhances the reputation of kit builders, if you follow the rules and do not attempt to find loopholes. It costs no more to do the job properly. Most of these rules were devised with safety in mind, so why ignore them?

Before we get into the detail, and in case you do not consider the subject to be serious, take a look at this statement by Cecil Parkinson, Secretary of State for Transport, 1989.

"The provisions of regulation 74 of the Construction and Use regulations apply in respect of lighting equipment and reflectors with which a vehicle is required by these regulations to be fitted, in the same way as they apply in respect of brakes, steering gear, silencers and tyres."

Obligatory Lamps are categorised as follows:

- Front position (side) lamps
- Dipped beam headlight
- Main beam headlight
- Direction indicators
- Hazard warning signal
- Rear position (tail) lamp
- Rear fog light
- Stop lamp
- Rear registration plate lamp
- ☑ Rear retro reflector

The position and requirements for obligatory lamps are:

FRONT POSITION LAMPS

- Two are required, they must be a matched pair.
- The maximum distance from the outer edge of the vehicle is 400 mm
- The maximum height is 1500 mm.
- Angle of visibility 80 degrees - outward 45 degrees, inwards 35 degrees and at least 50% of the illuminated area must be visible throughout this arc. And 15 degrees above and below the horizontal (or 15 degrees above and 5 degrees below if the lamp is less than 750mm above ground level).
- Approval mark 'A'
- Alignment - forward facing
- Colour - white (yellow permitted if incorporated in headlights)

DIPPED BEAM HEADLIGHTS

- Two required, must be a matched pair
- Max distance from outer edge of vehicle is 400mm
- Max. height above ground is 1200mm
- Min height above ground is 500mm
- Approval mark 'C'
- Alignment (vehicle at kerb weight with 75 kg on driver's seat) - Lamp with approval mark shall be set so that the horizontal part of the cut-off beam pattern is inclined downwards as indicated by the manufacturer's marking (see approval markings chart)
- Colour - white or yellow

MAIN BEAM HEADLIGHTS

- Two required, must be matched pair
- Position - not closer to the edge of the vehicle than the dipped beam headlights
- Approval mark 'R'
- Wiring - can be switched to dipped beam
- Both must switch simultaneously
- Main beam warning light must be fitted
- Must be capable of adjustment with the vehicle stationary

DIRECTION INDICATORS

- One front, one rear & one side repeater on each side of the vehicle
- Approval marks - Front 1, 1a or 1b; Rear 2, 2a or 2b; side repeater 5
- Position - Repeater to be sited within 2600 mm of front of vehicle. Front/rear - within 400mm of outer edge of vehicle. Minimum separation 500mm. Max. height 1500mm. Min height 350mm.
- Both front and rear must be a matched pair
- Visibility side repeater - 5 degrees to 65

degree arc when viewed from directly behind the vehicle

- Visibility front/rear - 80 degrees outward and 45 degrees inward with 50% of illuminated area to be visible throughout this arc. 15 degrees above and below the horizontal or 15 degrees up and 5 degrees down if the lamps are less than 750mm above ground level.
- Alignment - front indicators to face front; rear to face rear.
- Colour - amber
- Wiring - all indicators on one side to be operated by one switch. Warning light required if indicators are not visible from the driver's seat
- Flashing rate of 60 to 100 per minute

HAZARD WARNING DEVICE

- Must be operated by one switch
- Must have separate warning lamp
- Must work with the ignition off

REAR POSITION LAMPS

- Position - within 400mm of edge of vehicle
- Min separation - 500mm
- Max. height - 1500 mm
- Min height - 350mm
- Visibility - 80 degrees outward, 45 degrees inwards. 15 degrees above and below the horizontal or 15 degrees above 5 degrees below if less than 750mm above ground level
- Alignment - rearward facing
- Colour - red
- Approval mark 'R'

REAR FOG LAMP

- One lamp is obligatory - two lamps are optional
- Position - centre or to offside
- Max. height - 1000mm

- Min height - 250mm
- Separation from stop light- 100mm
- Visibility - 25 degrees inwards and outwards. 5 degrees above and below horizontal
- Alignment - rearward facing
- Colour - red
- Must have warning lamp
- Must not be connected to brake light circuit
- Approval - 'B' or 'F'
- If two lamps are fitted they must be a matched pair

STOP LAMPS

- Two are required
- Position - each side of vehicle centreline
- Minimum separation - 400mm
- Max. height - 1500mm
- Minimum height - 350mm
- Visibility - 45 degrees inward and outward. 15 degrees above and below the horizontal or 15 degrees above and 5 degrees below if less than 750mm high
- Alignment - must face to rear
- Colour - red
- Approval 'S1' or 'S2'
- Must be wired to service brake system

REGISTRATION PLATE LAMPS

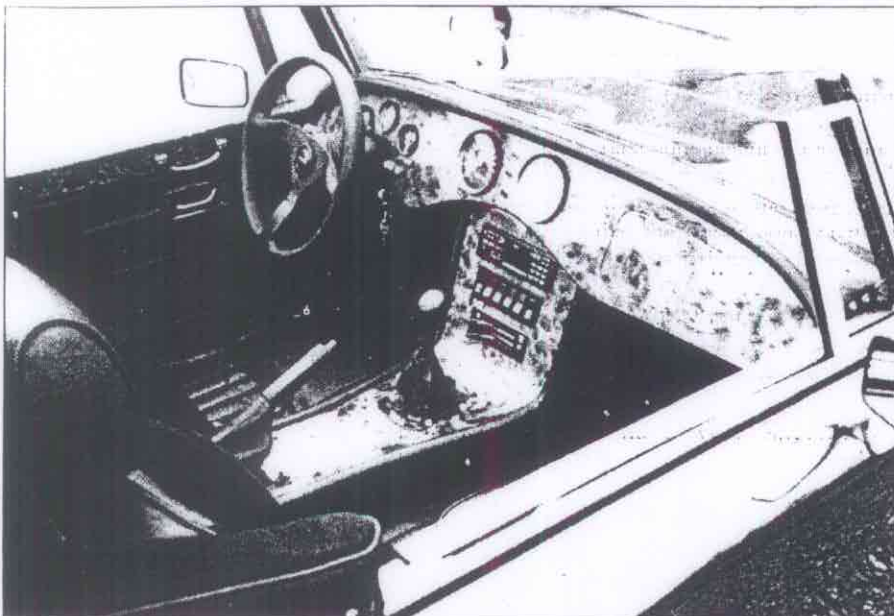
- Must adequately illuminate the number plate
- Colour - white

REAR RETRO REFLECTORS

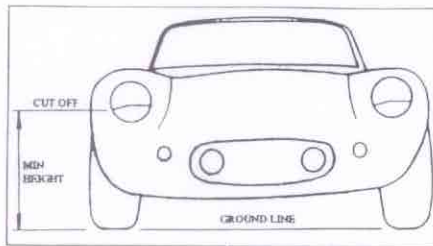
- Two must be fitted
- Position - within 400mm of vehicle edge
- Separation - 600mm minimum,
- Maximum height - 900mm. Minimum height - 350mm
- Visibility - 30 degrees inward and outward. 15 degrees above and below the horizontal or 15 degrees above and 5 degrees below if fitted less than 750mm high
- Alignment - must face toward the rear
- Approval - I or Ia
- Colour - red

The 1994 amendment permits the fitting of rear lights, reflectors and indicators to a movable part of the vehicle. However, there is a requirement for them to be visible when the bootlid, rear door or engine cover etc. are open. The front lamps are permitted to turn with the steering - this would cover sidelights mounted on cycle wings

The term 'Maximum height' is the height above which no part of the illuminated area in the case of a lamp, or the reflecting area in the case of a reflector, extends when the vehicle is at its kerbside weight and each tyre is inflated to the



It is necessary to fit the correct dashboard warning lights and wire the car accordingly



The cut-off for dipped beam headlamp could be any height up the lens

makers recommended pressure. Minimum height is the distance below which no part of the illuminated area extends.... etc.

Lamp positions are normally measured to the edge of the light emitting surface. In many instances this is the edge of the lens, but in the case of a dipped beam headlamp, light is only emitted from the top section of the lens. The regulations state "In the case of a dipped beam headlamp, the illuminating surface is limited by the apparent trace of the cut-off on the lens".

The cut-off could be any height up the lens, particularly on modern lamps which have a short vertical height. On conventional modern 7" round lamps it is just below the centre. Some older lamps do not have a distinctive cut-off on the lens and are best avoided.

OPTIONAL LAMPS

EXTRA MAIN BEAM HEADLAMPS

- Any number are permitted
- They must extinguish when dipped beam is selected

FRONT FOG LAMPS

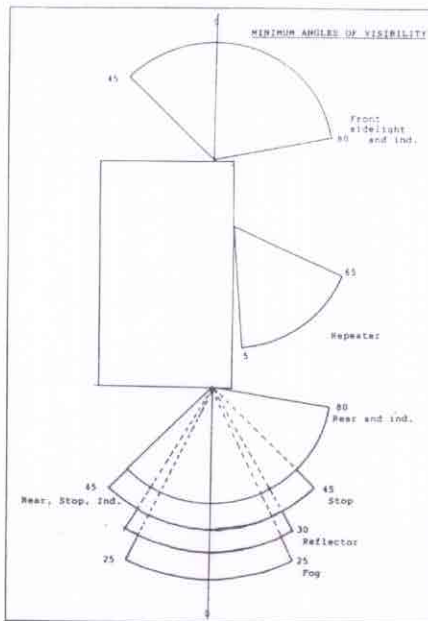
- Not more than two to be fitted
- Must only be used in fog or severely reduced visibility, in place of normal dipped beam headlamps
- Position - within 400 mm of outside edge of vehicle
- Maximum height - 1200mm; Minimum height - no requirement
- Alignment - to the front and aimed so that the upper edge of the beam is 3 degrees below the horizontal with the vehicle at kerb weight and 75 kilos in the driver's seat
- Approval 'B'
- Colour white or yellow

EXTRA INDICATORS

- 2 extra rear indicators are allowed and any number of side repeaters may be fitted

REVERSING LAMPS

- Not more than two may be fitted
- Must be aligned to the rear



- Approval - 'AR'
- Colour - white
- Must have a warning light on the dashboard if not switched by selecting reverse gear

NOTES ON OBSCURATION

Every vehicle shall be so constructed so that at least part of the apparent surface of any front and rear position lamp, front and rear direction indicator and rear retro reflector which is required to be fitted to the vehicle is visible when the vehicle is viewed from any point directly in front of, or behind, the lamp or reflector, as appropriate, when every door, tailgate, bootlid, engine cover, cab or other movable part of the vehicle is in the fixed open position.

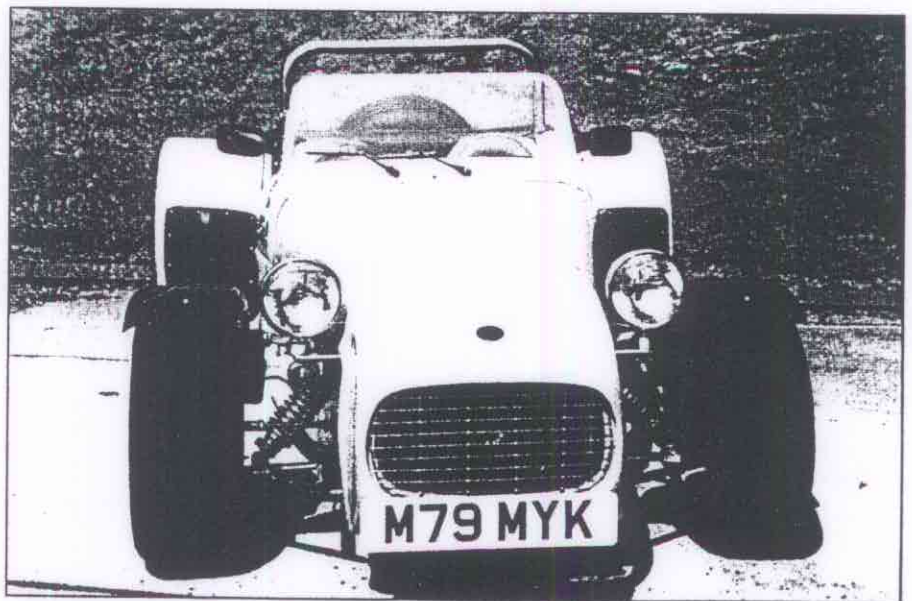
APPROVAL MARKS

- A Front side lights
- C Dipped beam headlight
- R Main beam headlamp
- H Halogen headlamp
- B Front fog lamp, white or yellow
- I Front indicator - fitted at least 40mm from headlamp or foglamp
- 1a Front indicator - fitted at least 20mm from headlamp or foglamp
- 1b Front indicator - fitted within 20mm from headlamp or foglamp
- 2a Rear indicator with single intensity
- 2b Rear indicator with dual intensity
- 5 Side repeater
- R Rear light
- B or F Rear fog lamp
- S1 Stoptlamp with single intensity
- S2 Stoptlamp with dual intensity
- I Class I reflector
- 1a Class 1a reflector

Common combinations are R-S1 - stop/tail lamp; HCR Halogen headlamp with both main and dipped beams.

This list is not totally definitive, but it covers what you need to know for cars. A contentious issue would seem to be the use of motorcycle front indicators because they are probably not legal when fitted to cars.

Returning to the main issue, if you are building now, or planning to build in the near future, you would be well advised to work within these rules. I am assured that when the SVA scheme is in operation, these requirements will be checked by the tester.



Cars such as the Tiger Super six will not have any trouble in complying with lighting regs because the headlamps can be adjusted for height but people will also have to be aware of angles of visibility