

Get Your One-Off Special Through The SVA Test

The SVA test. Just three little words, yet, to the builder of a one-off car they have the ability to reduce the meanest, moodiest most macho male to a quivering, palpitating mess, and they are also one of the fastest cures for constipation known to man!

So what is so frightening about SVA? Well actually very little, it is administered by VOSA, a government department run by civil servants, they're not always civil, they don't always seem to be acting as your servant, but nevertheless that is the case. It is well worthwhile remembering that it is a government department you are dealing with, you can't just ring up & arrange an appointment, forms need to be filled in & posted off, it isn't like nipping down to your local MoT testing station & if you turn up significantly late for your test (no excuses will make the slightest difference here) you will be turned away.

The people who will be checking your vehicle over are trained to do just that, & they work to a very strict rule book. Your first step is to obtain a copy of that rule book the "Single Vehicle Approval Inspection Manual" if you're an insomniac you've probably just found the cure, exciting reading it is not, but before embarking on possibly years, & certainly several hundred hours (my Furore took almost 2000 hours & 3 & ½ years) of hard work it pays to have read the manual from cover to cover & understood the bulk of it.

The first sections of the manual refer to "Enhanced SVA" you'll be pleased to hear you can skip this as ESVA does not apply to amateur built vehicles – "Hurray" I hear you cry, unfortunately the vast bulk of the rest of the manual does apply, so best you get reading. Now this article is too short to deal with each section of the manual in detail & much of the routine stuff which applies in just the same way to a one-off as it does to a mass produced kitcar has been covered in some detail in the pages of this magazine before, I'm sure if you ask nicely back issues are probably still available. What I will do is try to highlight some of the areas which may be more confusing & areas where something which is unique, has no manufacturer backup, & has therefore never been through SVA before is likely to come unstuck.

The first section we'll deal with is the "anti theft device". The simplest form of this is the steering lock & providing you have a working steering lock, no problem, pretty obvious you may say, but just the sort of thing which some people may prefer to eschew in favour of reducing weight or fitting one of these marvellous rocket launcher type switches with the red cover over. You can have that in addition to the steering lock, but not instead of. If you don't want a steering lock you must have some other form of anti theft device which must be permanently fitted & conforms to the guidelines in the book. Take a good look at the reasons for failure.

The next sections concern the windscreen, defrost/demist & wipers & washers & brings me to a very important point - IF IT'S NOT FITTED THEY DON'T TEST IT – this applies to items such as the windscreen & side window glass, if it's fitted it must be kitemarked, if it's not fitted, it doesn't come into the test!. Now I'm not advocating

cheating, or dodging parts of the test, but the rules have been written & you have to comply with them. Why make it any harder than it needs to be, some parts of the test really don't make much sense with regard to kitcars, if you have a full windscreen, you must have a demisting system fitted, there are some handy electrical ones available, just check the adverts, but, being realistic, how many kitcars actually get used in weather where demisting is likely to be an issue, only a handful I would suggest, & if you're one of the brave souls to venture out in those conditions then it would be foolish not to have a decent demisting system fitted; horses for courses as they say.

The area we'll look at next is seat belts, this one is a real minefield for the one-off builder as they will want to know that your seat belt mounts are at least as strong as anything in production. On my car they are very hard to get at & the tester virtually stood on his head in both seats with a bendy torch & a mirror trying to see them. I would recommend taking photographs of exactly what has been used & how the mount was welded & assembled, I cut the mounting points out of a production car which gave me the threaded plates & standard bolts all ready for the plates to be welded in position. If you're using 16 gauge steel the area around the seat belt mount should be strengthened with a heavier gauge to spread the load. It is essential that all of this is properly seam welded – if your welding isn't up to this standard you shouldn't be building a chassis yourself anyway. Also any chassis member the mount is attached to, or part thereof, must be fully seam welded into the surrounding structure. When you are designing where the mounts are to be situated (by designing I mean sitting in roughly the correct position on an upturned milk crate brandishing an unattached steering wheel & usually making vroom vroom noises) it's important to ensure the mounts are such that you have adequate adjustment for midgets like myself &, how shall I put it, the larger framed individual.

The mounting(s) most likely to cause problems due to their position, are the ones for the upper belt mount(s), this commonly causes problems for old roadster style vehicles designed prior to SVA as sometimes there is no substantial body structure to attach the belt mounting to. The manual refers to a reference point: this reference point is established by placing a block measuring 136mm wide by 53mm (that's a little over 5"x 2" in old money), your measurement is then taken vertically from the front top corner of this block. Use a spirit level to establish the height of your seat belt mount(s) above this reference point, it must be more than 450mm. Also, if you are using a lap/diagonal type belt, the upper mount must be at least 140mm to the side measured at right angles to a line taken longitudinally through the centre of the seat.

Note that where you use existing belts which mount the buckle section on the seat, all seat mountings then effectively become seat belt mounts & must be suitably substantial & secure. If your belts pass through the seat, such as a full harness passing through holes in the seat back, it is important that the belts pass through without a deviation of direction or the part causing the deviation then has to come up to the full strength requirements of a seat belt mounting! The same goes for any other part which causes a seat belt to deviate. Phew, that was exciting wasn't it.

Moving swiftly on, I will mention only a few points on both the interior & exterior, the most important of which are those old bad pennies, sharp edges. There are various different radii depending on the exact areas concerned & again it's too detailed for this

article, but if you have any doubt then cover it with some form of protection, rubber strip or channel is ideal for this sort of thing, but you must ensure it is securely fixed in place, “temporary” repairs/installations are not allowed. If you can stop it from being touched by the “examining sphere” (the examiner will go around the vehicle with either something that looks rather like a ball cock from a toilet cistern, or a device like half a football attached to a metal bar to determine which items are contactable) then it isn’t included in the test for sharp edges, so putting an under dash trim of hardboard, aluminium or similar, using similar covers over other sharp items & metal mesh in any external orifices to stop the examiner from getting in there can all reduce the potential for failure items; just make sure that none of your covers & fixings have any contactable sharp edges themselves. One further thing worth mentioning is that you have 3 “exempt” areas where the sharp edge criteria don’t apply. The first behind the steering wheel & to a radius 127mm larger than the wheel itself, the second the part of the instrument panel between the wheel & the nearest inner side of the vehicle, bounded by the upper edge of the instrument panel & a line drawn horizontally to the lower edge of the steering column area & the third the windscreen pillars. Due to the narrow cockpit of my car the whole dash was exempt!

Lighting is another area where it is easy to trip yourself up, but the manual gives the information you require very clearly in chart form in Annex 1 “Requirements for obligatory lamps” it’s worth noting that there are various “get out clauses” covered by notes within this chart which sometimes mean that something you may think initially unacceptable may, in fact, be ok after all. One which I used to my advantage was that although the side, direction indicator & stop lamps can all be between 350mm to 1500mm from the ground, the rear reflectors (in my case part of the lamp cluster) have a maximum height of 900mm. My rear lamps were around 1000mm, however there is a note which states that where impracticable to comply with the lower height the reflectors may be up to 1200mm high (this applies only where there is no significant bodywork below the height required) – this was deemed satisfactory in my case as there was little bodywork below the rear wing where the lights were fitted. Again read & understand the regulations & make them work for, rather than against you, the inspectors are there only to apply the rules, not to make you suffer.

I’ll move on to mirrors & field of view requirements next, but just a quick mention of some strange anomalies within the test, of which you may not be aware. When filling the SVA forms out you will be asked the top speed of your vehicle – the design speed, don’t be tempted to put a high figure in here as, if you do your speedo has to read above that figure (tricky if you wrote 180mph in!) & your tyres must also be suitably speed rated. A good figure is 119mph as there are many 120mph speedo’s around & this falls below many of the tyre speed ratings. Strangely a push bike speedo is perfectly ok providing it can be shown to read up to the speed required, which can be shown by displaying maximum speed on the digital display or by supporting paperwork, it will be checked for accuracy which is nigh on impossible for you to set accurately prior to the test, but they will normally allow you to make reasonable adjustments during the speedo check. The speedo must also be illuminated, but not necessarily from inside. The tyres must be adequately speed rated, but, & you won’t believe this one, they can be bald! Yes, really,

& another odd one, there is no requirement for a horn, although obviously both the above items would be required for the MoT test.

Ok, so on to mirrors, or more particularly field of view. You must have an interior or central rear view mirror where possible, & an offside mirror; where a central mirror is impractical, you must have both offside & nearside mirrors. There are some critical requirements for the mirrors, but most mirrors available would fulfill the criteria, providing they have no sharp edges, fold back if they protrude outside the plan form of the vehicle & aren't ludicrously small you should be fine, I used a pair of motorcycle mirrors. However, field of view is a whole different ball game, particularly if you are building a single seater type vehicle such as I did & made even worse if you are running large wheels & tyres. You need to take a good look at Annex 2 "Mirror field of view check", the main requirements being that certain floor markings are visible at distances from 10m to 60m behind the vehicle, this makes it very difficult to check outside of the test centre as not many of us are fortunate enough to have a 30m by 60m area of flat, unobstructed ground on which to place the car! I can suggest only that you do your utmost to ensure you comply as it is almost impossible to make changes during the test other than minor adjustments. Oddly you may find that by making the mirror more vertical (a "portrait" view rather than "landscape") can make a significant difference. Should your vehicle fail on this item, make sure you understand fully what will be needed to pass, the inspectors are usually helpful with regard to making suggestions (scrap it, burn it, don't bring it back here, being the most common).

Well, we're getting there gradually, I will now deal with steering, particularly the steering wheel & column assembly. Reading the manual section 14 "Protective Steering" requires a degree in Engineering, another in Law & probably a third in English would be useful! I will do my best to put its main points into plain English. I would suggest by far the safest route is to present the vehicle with the complete steering wheel & column assembly from a common production vehicle & mounted in much the same way as it was in the original vehicle; if this is not practical then a second best would be to use just the column assembly from a production vehicle with a suitable aftermarket steering wheel, if you can purchase a deformable plastic centre for the hub of the wheel so much the better. It is essential that the upper column mounting is sufficiently secure to allow any lower column to deform as the manufacturer intended, this may be via angled u/j's, a sliding, or disconnecting coupling, or by a collapsible section built into the column itself, sometimes the steering wheel hub itself may also have a collapsible or deformable section. In addition to the safety aspects mentioned above the examiners will be looking for a substantial deformable section at the front of the vehicle, which should not be fully triangulated, this becomes more important where the steering rack (or box) is in front of the axle centerline due to the increased risk of the column being forced back into the driver's compartment. If the front wheels would be amongst the first items to make contact in the event of a frontal accident, then the path of the load through the hubs & suspension back to the chassis will be closely examined as will the side support for the chassis where the suspension is mounted. Bear in mind that the examiners have a marvellous clause under the "Vehicle design & construction" section, which gives as a reason for failure "A design or construction feature or characteristic is, or is likely to cause, a danger to any person in the vehicle or to other road users". I think you could

disqualify most kitcars with this clause simply due to the amount of head turning & doubletakes that they cause! Fortunately that doesn't appear to have happened – yet.

Almost there, noise & emissions now & I'll cover them both together. Noise first & another of those strange anomalies; now I don't know if this goes for all test stations, but certainly was the case at Chelmsford at the time of my test in June 2005. For the noise test you have to hold the engine at steady rpm whilst the noise reading is taken, again this is one of the items over which you have some influence because the rpm required will be based upon your declared maximum power rpm on the form you filled out when applying for the test; I'm not telling you to tell porkies, but certainly don't give a higher rpm than you need to as you will simply be making the noise test harder to pass. I don't have a rev counter on my car due to lack of dash space, I want eventually to have two rows of L.E.D's to tell me what the engines are doing, but that's another story, so when the examiner told me to hold the engines at 5,000rpm I informed him I had no rev counter, expecting him to produce some sort of handheld device to clip onto a plug lead or something similar, instead he said "nor have we! Just guess!" now of course I wouldn't suggest that I held the revs lower than 5,000, after all he'd have spotted that – right? Let's just say I wasn't inclined to take the engines up to 6,000+, it really wouldn't have been in my interest would it? Suffice to say the car sailed through the noise test at 94db! Moral of the story – fit the rev counter after the test.

So, on to the emission test, a lot of this depends on the age of your engine, the onus of proof of age being on you, otherwise they will assume your engine is post 1995 & you will have to meet the catalyst criteria. If your engine has a first use date prior to August 1st 1995 then the only emission requirements are that there is no significant smoke, that CO emissions at idle are below 3.5% & that HC emissions at idle are below 1200ppm. Almost any reasonably modern car engine which is running properly should sail through these criteria, bike engines however may struggle with the HC emission at idle due to the fact they use pretty wild cam angles & therefore deposit considerable amounts of unburnt fuel (HC's) into the exhaust, fortunately there is one of those "get out of jail free" clauses which apply & if your engine fails at idle the tester should automatically take the engine up to around 2000rpm & recheck it. Again any properly set up engine should pass at this point, if it doesn't, you have an airleak, or fuel or oil being dumped into the combustion process, or the exhaust by whatever means.

I'd now say, "finally", but I'm saving that for the last section, as we're not quite finished yet. The catalyst test; I won't go into great detail as that is not the purpose of this article, but my advice would be that if using a bike engine then go for a pre-95 unit, it's not impossible to get a bike engine through the catalyst test, but it's never going to be easy, simply because bike engines were never designed to do so as they have no emission test to comply with in this country. It might actually be cheaper, & more straightforward to fit an early engine for the test & replace it with a later one afterwards, rather than pay out for & fit lambda sensor, catalytic converter & E.C.U. necessary to get a later engine through the test, & yes to the best of my knowledge that is legitimate, although you obviously wouldn't be intending to do that at the time of test – would you? One other possibility if you're determined to go the late bike engine route would be to import an engine with all the emissions gubbins already fitted, however be advised that I believe engines typically

turning out 140bhp over here have around 100bhp in California purely due to changes made to comply with emissions.

For car engines the options are far more straightforward, I would suggest wherever possible if using a post August 1995 engine to get an emissions report from an MoT garage before stripping the donor vehicle, if it passes then you know providing you transpose everything correctly it will still pass in its new home. If you're fitting an aftermarket fuel injection system & E.C.U. then ensure the supplier confirms it will pass the catalyst test. If fitting carbs, such as twin choke Webbers etc. you will almost certainly need to fit some form of electronic control to give the correct fuel mix to the "Cat". Something you may find strange is that although the later engined vehicle has to pass a catalyst test, it doesn't actually need to have a catalyst fitted, however to get it through the test without a catalyst would require some very fine tuning indeed.

Finally - boy are you glad to read that? Both of you that are still awake that is! Vehicle weights & chassis plate; it is essential that a chassis number is permanently marked on the chassis, that means stamped or etched into it, not just on a plate riveted on, I used an engraving tool which I bought quite cheaply from Snap On years ago, I would imagine similar devices are probably available from Machine Mart or other suppliers. Make sure your chassis number is sufficiently long or complex that it is unlikely to be accidentally duplicated, I believe car manufacturers usually have 17 digits, but you don't have to go quite that far. If you are going to use metal stamps then I would suggest stamp a plate up first then seam weld it onto the chassis, even 12 gauge steel sections won't take kindly to being belted with a letter punch & 16 gauge would certainly distort. I also made up a "manufacturer's plate" in aluminium & riveted it on, which is not a requirement, but it is a good idea to show the chassis number more than once & allows you to show axle weights at the same time, again not a requirement to be shown, but you will have had to declare your axle 1, axle 2, & design gross weights on the application form. To work these out there is a calculation shown in the manual, section 21 "Calculation of maximum permitted axle weight & maximum gross weight". Again it's rather too involved to go through here, but if you are unsure of your maths then get someone else to check the calculations with you, if you get it wrong, even by a few kilos, you'll probably have to make a completely fresh submission to get the weights changed. Hence, I would say over allow by some considerable amount, however these weights are used for the calculations to test the braking efficiency, so if you set the weights too high it could be very difficult to pass the brake test. Much like the rest of the test, if you read the manual thoroughly, & when you wake up, read it again & apply the lessons learned, you should be fine. I shall look forward to seeing all sorts of weird & wonderful creations gracing the pages of Kitcar in due course, but please, please, don't build something that looks like a Lotus 7 & tell me you've built a one-off special! Good luck with your builds & give that SVA inspector a nice big sloppy kiss from me!