

Fitting of the body shell

You should now have most of the body shell trimmed and ready to go on the chassis for the final fitting.

Tools and equipment needed:

1. Hand drill and drill bit as required for rivets used. Rivets are mainly in imperial sizes but there are metric as well. It is best to have the drill bit 0.2/0.3mm bigger than the rivets (i.e. 3.2 needs 3.4 or 3.5mm hole). If the hole is too tight, you may have problems inserting the rivets.
2. Pop rivet gun (a nice AIR operated gun will save time and your wrists).
3. Sealant gun (a nice AIR operated gun will save time and fingers).
4. Files and Die grinder (to remove any snagging areas).
5. Alloy strips to connect the sill to the chassis.
6. Hole clamps (skin pins – the same size as the rivets) these are not essential but are very helpful and can be obtained from several company's that deal in car components and accessories.(Europa spares, Marlin, Frost brothers, etc)
7. A good selection of "G" cramps (2" to 6"). You can never have too many G cramps.
8. Pop rivets 3/16" or 5mm diameter with large head and ¾ to 1 ¼ (20mm to 32mm) in length. You will need about 200 numbers
9. At least 3 tubes of **PU** sealant, **NOT SILICON** as this will not bond the same as **PU adhesive** sealant (PU is the same material used for bonding windscreens). One trade name is "**Tiger seal**" or any equivalent. It can be obtained from most motor factor shops or car body paint shops.
10. Rags or paper wipers & solvent (for removing excess sealant).
11. At least 3 strong mates.

Stage 1

1. You first need to work out the areas that will mate with the chassis once the body is in position. This can be done by trial fit the body over the chassis and then marking the contact areas from underneath. Make a hole in the floor pan to allow the seat belt anchor to pass through and sit flat on the chassis. If you ordered your body and chassis at the same time, you should have these marked before you reach this point.
2. Mark the approximate positions of the chassis rails on the inside of the floor pans (both sides) and then mark out the positions of the rivet holes. This is not something that needs to be that close a tolerance and can be done with a thick marker pen or scribe. As long as the rivet holes do not "miss" the chassis rail underneath then they are OK,
3. The spacing should be **no more** than 4"or 100mm and not **less** than 3"or 75mm, it is best to mark all the corner rivet holes first and then fill in the straights afterwards as shown below.



4. Before drilling any of the holes you need to make sure the body is in exactly the right place and is not sitting up or jammed on any part of the chassis. With a ratchet strap or rope and a lorry drivers sheeting knot (slip knot), place the strap around the chassis cross rail and around the nose trough the oil cooler hole and radiator hole and put a small amount of tension on the strap/rope.
5. Lift the rear end up one or two inches and then lower the body back down. This should ensure the body is at its most rearward point as it will move forward as it contacts at the rear bulkhead. You should find that there is very little “side to side” movement, with the wheels on check. Move as required to ensure the body is centered correctly.
6. With two small “G” cramps, clamp the bulkhead sides to the upper chassis rails as in the photo below (we have removed the engine for clarity)

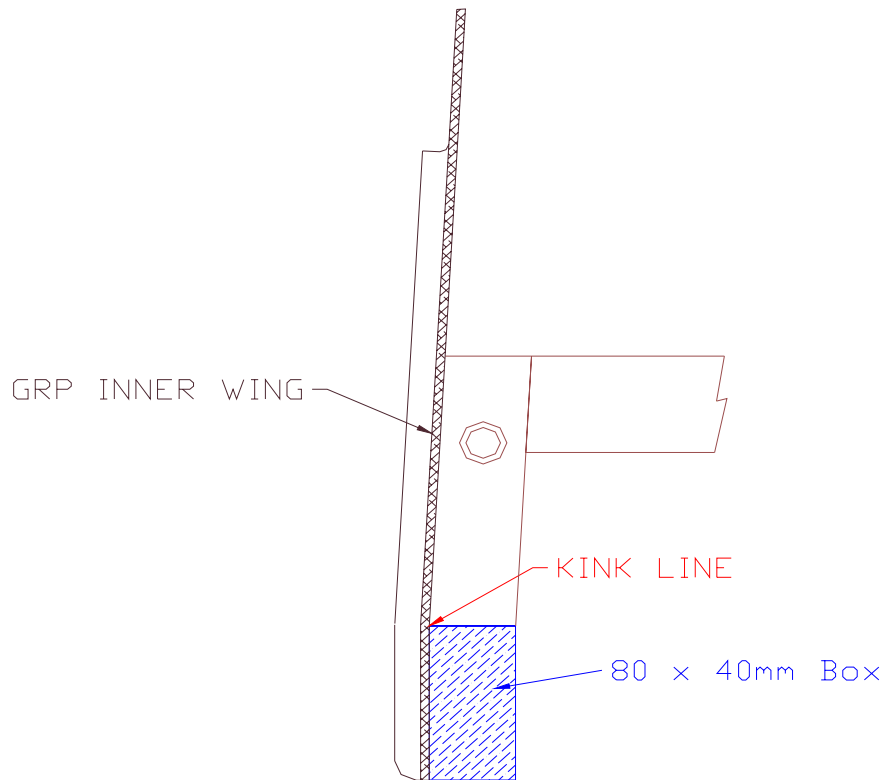


7. Now mark the rivet holes in the sides of the bulkhead section. **Note:** It is very important that there is **no gap** under the bulk head to the chassis. If the floor area is riveted and pulled down this will move the side holes positions and make it very difficult to fit the rivets. If you then have to open up the holes, this can reduce the strength of the joint, and introduce swarf (metal cuttings/shavings) particles into the bonding compound.



8. Move to the rear of the car and drill up from underneath the four bumper bracket holes at each side of the boot (3/8" 9.5mm). Fit two **M8 x 25mm** temporary clamping bolts, one at each side..

- 9.** Mark out the boot rivets at the same spacing as the floor. Note the staggered rivets along the rear most transverse rail.
- 10.** Move to the front wheel arches. Use a 3 inch (75mm) “G” clamp to hold the GRP inner wheel arch to the chassis 80 x 40 mm box section loosely. There is a certain amount of “flex” in all GRP and you will find that you can raise or lower the nose of the body a small amount (3 or 4mm up and down) to ensure the nose is in the correct position (there are small “kink” lines in the inner wings). These should be level with the top edge of the 80 x 40mm chassis rail each side, and then clamp tight.



- 11.** Once the inner wings are clamped, the nose should be very solid and should not move up and down. Look around the body, eye across the car and view it from all angles to make sure you are happy with the fit and alignment of the body. It should “looks right”, since there is nothing better than the human eye for noticing something that is not straight or level. Adjust as required.
- 12.** When you are happy with the fitment of the body, mark out the rivet holes in the sides of the wheel arches into the chassis as in the picture below, at 2”to 3” 50 to 75mm spacing.



13. Note: *There are no rivets into the radiator support bracket as there is a Joggle or set in the inner wing to allow the bumper/crumple bracket to be fitted later. If you place any rivets in this area it will cause you problems! So don't do it!*

14. Finally you are ready to start drilling all the holes for the fixings. If you are not experienced at sharpening drill bits, its best to drill a pilot hole first around 3 to 4 mm. Then go around again and open up to the rivet size. This is because a dull drill bit will tend to “WANDER” and can cut more of a “slot” into the GRP than a round hole. If you can sharpen a drill with a thinned web, then it is fine to go through with the finished size to start with. Unless you are an engineer you probably will not have had the experience in drill bit sharpening. Best to take a little more time and complete the job correctly.

15. If you have hole clamps (skin pins) fits these first, in the corner holes to pull the GRP down tight to the chassis as you work your way around. If you do not have these, then a few well placed “G” cramps will suffice.

16. With all the holes drilled and opened out to the rivet size (the rivets should drop in the hole without having to force them in) clean out all the swarf from drilling and clean out the boot and cockpit area to aid finding all the holes later and prevent swarf from getting in between the joints.

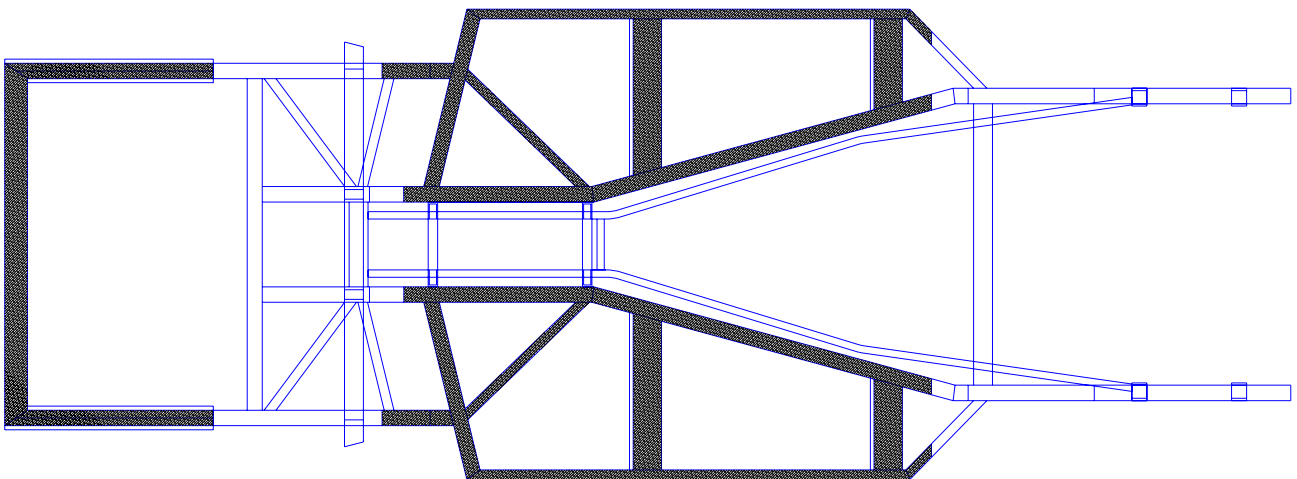
17. With a long dill bit from underneath of the sill drill a small hole up through the GRP floor pan, at the center point of the two tubes welded horizontally through the 25x50 sill box. This gives you a reference point to start cutting out the holes in the floor pan to fit the side structures and brace bar to the chassis.



18. Trial fit the side steel work to make sure that it fits through the holes you have cut, and test fit all the bolts.



- 19.** Remove the body shell from the chassis (see removal and transporting section) and place on some stands to gain access to the under side. Sand all the areas that come into contact with the chassis and out to 1 inch (25mm) from the edges of the box sections to allow for a radius bead of sealant to run along the sides of the chassis box sections. This can be done by hand or with a power sander with 40 or 60 grit papers. This is to give a good “Key” to the GRP for the bonding.
- 20.** Clean and sand the matting faces on the chassis rails and around the edges, just enough to rough the surface but NOT enough to remove the galvanizing from the chassis. If any grease or oil has worked its way onto the bonding areas remove with a solvent or spirit wipe .
- 21.** Now you are ready to apply the sealant to the top surfaces of the floor panels, rear bulkhead and boot. **DO NOT** apply to the **wheel arches** or the **sides of the engine bulkhead**, as it is very difficult to cover all the surfaces before the sealant starts to cure and “skin up”. These areas can be accessed later. If you have two sealant guns its best to run down both sides at the same time and meet at the rear boot rail. The bead size should be around 1/4” to 5/16” (6 to 8mm) and on large areas, its best to weave from side to side to cover all the areas to be bonded.



- 22.** Now the tricky bit. With your mates, lift the body back over the chassis for the last time. Lower rear end slowly, first pushing backwards as you lower the front. With a pointed object, such as a scribe or a taper pin, locate the body back into position. If you have a hole clamps (skin pins) it is good to have several mates fitting these to save time. It is also handy to have a mate to hand you rivets and such. **NOTE: You need to get the Rivets in the holes (corners first), and rivets in place and pulled down within 15 to 30 minutes depending on the temperature.** Also make sure you clean the hole clamps thoroughly of sealant, to ensure they work properly in the future.



23. As soon as you can, start to pull up the rivets working from the rear bulkhead forward towards the foot wells. It is best not to “pop” the first few rivets, just pull then up tight. This allows the sealant to squeeze out slowly. Then return to them in one or two minutes to spread the loading on the GRP evenly as you rivet along the chassis. This ensures that the rivets pull the GRP tight to the chassis and not just “popping” on wet sealant and leaving a large amount of sealant between the joint.

24. Now pull up the boot rivets. When the sealant comes out from the edges of the box sections and chassis rails on the underside, smooth along the edges with your finger to seal all the joints.



- 25.** With a wooden or plastic wedge, open up a gap between the GRP and the chassis top rail (19mm x 19mm box), just enough to insert the nozzle of the sealant on each side of the bulkhead. Apply a consistent bead of sealant and remove wedges. Insert rivets into holes and pull up enough to squeeze out the sealant. Pull rivets up completely and smooth along the edges with your finger to seal all the joints



- 26.** Insert the wedges in between the GRP and the chassis on each front wheel arches to gain access for the sealant nozzle, place a 6 to 8mm bead of sealant in between the joint.



- 27.** Remove the wedges, place the rivets or skin pins in to the holes, pull down to squeeze out the sealant, then “pop” the rivets home, as above.

- 28.** Now make two long (or Four short) strips from 1.6mm aluminum or 1mm stainless steel to fix the edge of the sill to the lower side of the outer chassis rail.



- 29.** You will need to kink the strip at the edge of the 50x25mm outer chassis rail to make the strip fit flat to the GRP and the chassis box, Drill at 60 to 75mm pitch as in the pictures above. Remove the strips and clean and rough up mating surfaces, add a 6 to 8mm bead of sealant along the both rows of holes and reposition with hole clamps (skin pins) and pull down. Insert rivets and pull up as before. Remove the access sealant.
- 30.** You have now completed all the riveting of the Body to the Chassis, It is a good time to clean all the tool and body of any misplaced sealant as it takes 24 hours to become full cured, and at this point in time solvents will remove it without too much effort. Once it has fully cured it cannot be melted by solvents and will be hard to remove. YOU have been warned! So best not to leave it to do later.
- 31.** Put the kettle on and make the helpers some tea or coffee, you never know when their help will be required again.