88D Models – Rhymney Railway S1 Class

This kit was designed to be assembled by modellers with varying skill levels. Were ever possible I've tried to provide an easy solution for the more difficult or tedious bits. The kit will produce a fine model but some of you will want to upgrade it by either substituting or even fabricating small extra details, a list of suggestions appears at the end.

A great deal of care has gone into designing this kit and I have "test" built one to ensure everything fits with the minimum of "fettling" by yourselves. Therefore when cleaning off the cusp left by etching - **remove only the cusps**, otherwise the parts will be undersize.

If you are an experienced modeller, then you won't need any help, however others might find these notes useful.

The main skill to master is soldering and the choice of soldering iron is endless, I have named some options under ***Suggested Tools*** below. Whichever make and model you choose you will need a selection of "bits". I get by with 3 - a small pointed one, a small chisel shaped one and lastly a large knife shaped one.

Soldering isn't a black art, you just need to know the rules and stick to them.

1) Make sure the surfaces to be soldered are clean. Use a glass fibre stick, scratch pen or very fine "wet & dry" paper to remove any oxidation, try to avoid tearing up the surface as it might show later. Preparation is very important on brass, even though it might look clean it still needs a clean, also the etching process can leave an invisible film.
2) Flux – avoid some of the varieties used by plumbers, they can be too powerful and more difficult to clean off, I use Duncan Models for almost everything. Keep a jar of clean water to hand and a small paint brush and when you have finished a section wash off the flux, it's far harder later. At the end of each model session thoroughly clean your model with a bit of washing up liquid and warm water. I often brush over with "ViaKal" and this both neutralises the acid flux and cleans your model.
3) Solder, I use 4 sorts. Rosen cored electrical solder for high temperature items i.e. fixing steps to the back plate. 190^0 for a more durable fixing, 145^0 everything else with exception of low melt for white metal items. I also have a separate iron for low melt solder as I find it can ruin the tips.
4) Use the solder sparingly; I can't stress enough the need to keep the model clean and tidy. If you inadvertently over apply the solder, drag the surplus out to an area where it can be removed with a craft knife and then buff up with a fibre glass pen. Always take the solder to the joint on the tip of the iron, don't feed it in.
5) It is important to keep the bit clean and in good condition as you work. Get a soldering iron stand containing a damp sponge as old oxidized solder is wiped off on this before picking up fresh solder for each joint. If you haven't made a joint for some time you may find that a hard black crust has formed on the bit. Remove this with a brass wire brush (suede brush) and then feed some multicore solder onto each side of the bit to restore a bright surface (referred to as wetting or tinning the bit). If you follow these rules you should achieve success. Practice on some scrap material to get your hand in first.

If you would like more details on soldering etc. go to Jim McGeown's - **Connoisseur Models site and follow the link "PDF print out sheets", he has taken a lot trouble to provide a wealth of information on how to build a kit.**

Kit guidelines

As this is a "multi-media" kit I recommend you read the instructions carefully before you begin and I list some pointers, sorry if I'm teaching you such eggs.

a) Don't cut parts from the etched sheets until you need them. Small items get lost or are difficult to identify.
b) Remove cusp from each part before assembly.
c) All etched fold lines are on the inside unless otherwise stated.
d) Some half etched holes are to be punched out as rivets, whereas other are to provide a centre hole to allow you to drill later, example: the outer tank sides need to be bent very close to the location of a handrail, if these were holes, the metal could crease at this point whilst bending.
e) Due the process of etching, the holes will most likely be a fraction under size. These will need to be carefully opened out and this is best done using tapered broaches or if you can afford it tapered reamers. Do it a little at a time, you can take more off but you can't put it back!
f) The plastic printed parts have a reasonably high melting point but is best to finally fix in place **after all the soldering is complete**.
g) **Extreme** care is required when handle the printed parts. The very thin and small parts will not stand up to rough handling or being dropped onto a hard floor – I've been there! However once fitted to the model it won't be a problem.
h) Take the shine off the surface of plastic parts which are to be glued to give the adhesive a good grip.
i) Always tack solder parts to ensure they correctly fitted and then solder permanently.

I will point out in the instructions if an assembly step is **critical** to get right.

Damaged Parts and Shortages.

If you damage an etching during construction it is not possible to replace individual pieces, but at a minimum cost replacement frets (this will one of the sheets as originally supplied) can be supplied, unless in stock 2-3 weeks turn around.

The printed parts are more difficult to replace, the printing company has a minimum order value so the only viable way of getting replacement part is to tack it on to a set of parts for another kit. This will inevitably lead to a delay in providing the part, as with an etched sheet, I will do it as cheaply as possible.

Items required to finish Kit

ABC Mini gearbox and motor (or alternative)
3 x Slater's 7853Y – 4' 5" wheels
1 x Slater's 7157 plunger pickups
Number Plates
Transfers
Paint

Optional upgrade items

Set of brass bodied buffers – various suppliers

Only cut parts from fret as needed and read each instruction fully before commencement.

Do not fit any printed parts until soldering is complete, they have a relatively high melting point but better safe than sorry.

All pictures and more are available at www.88d.uk/S1/Picures.asp

Construction

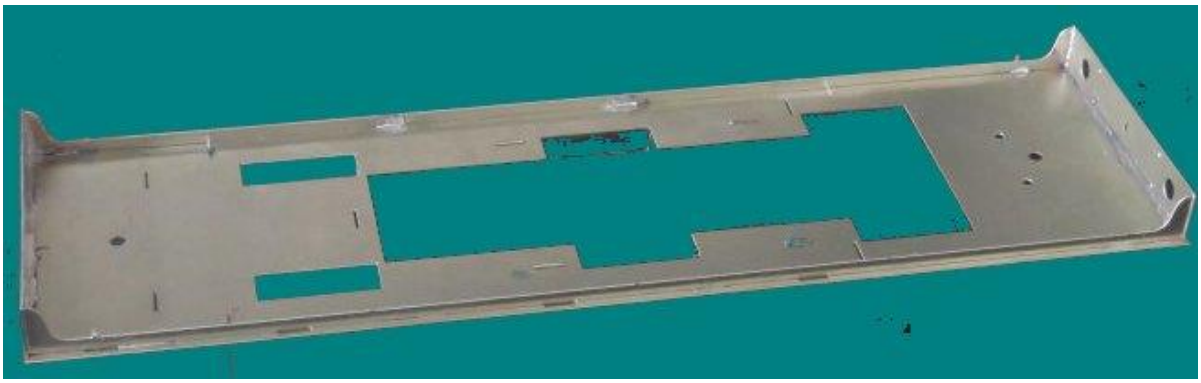
I suggest the following sequence of actions which should ensure a stress free build

1) Remove 1 (footplate) and 2 (valances) from sheet, detach any parts within the footplate and store safely. Clean off the cusp from the footplate and valances taking care not to bend or distort the valances.

2) With footplate upside down, tack solder valances into grooves, equal distance from each end, ensure they remain at 90^0 to the footplate. When satisfied finish soldering and check again they at 90^0 to footplate.

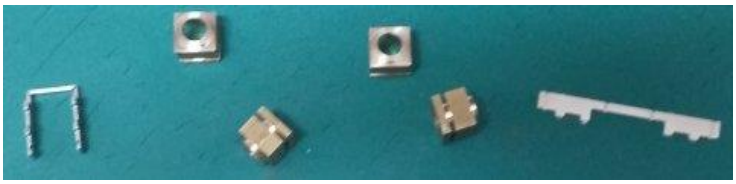
3) Remove and clean up 3 (buffer beams) and punch out half etched rivet holes.

4) Solder buffer beams on to ends of valances and footplate, groove furthest from footplate; make sure they overhang each side of buffer beams equally. You now have box into which the chassis has to fit.

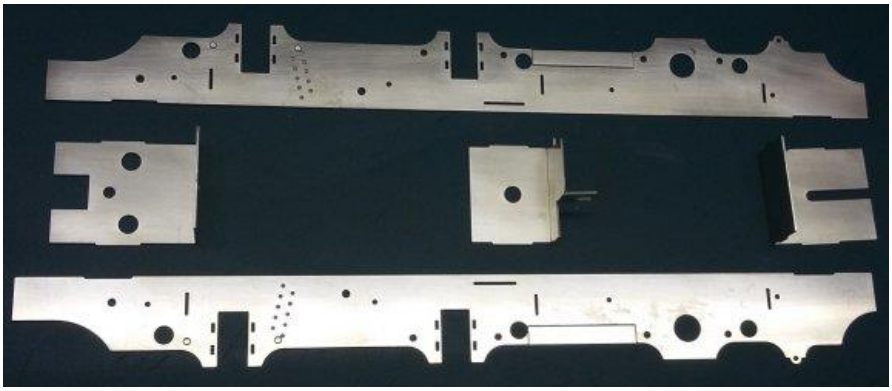


5) Locate 4 & 5 from chassis etch and remove cusp left by etching process, bolt together and offer to the footplate assembly, if they are too long remove an equal amount off each end until they fit comfortably inside the “box” of the footplate. The above action is **very important**, both to be able to keep the chassis square and is easier done now than when the chassis is assembled. When satisfied put the footplate to one side for now.

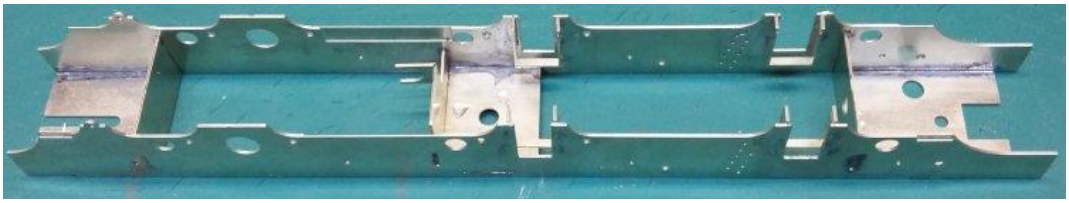
6) Remove 6 (4 off horn block guides) fold into U shape and dry fit into slots in frames. Ensure the horn block is a tight sliding fit, adjust until satisfied. With horn guide on the underside apply flux and solder to each tab, don’t overdo it as the solder will run through and build up on the inside and foul horn block. Check that each horn block slides freely but is not sloppy, file off tabs.



7) Remove 7, 8 & 9 (frame spacers), clean up cusp. Bend with the half etched lines on the inside. *Note! All bends will have the half etched line on the inside unless otherwise stated*. The kit is deigned to be fitted with an ABC motor/gearbox and a mounting bracket is incorporated as part of the centre spacer. Spacer 7 is at front and spacer 9 at the rear of the chassis.



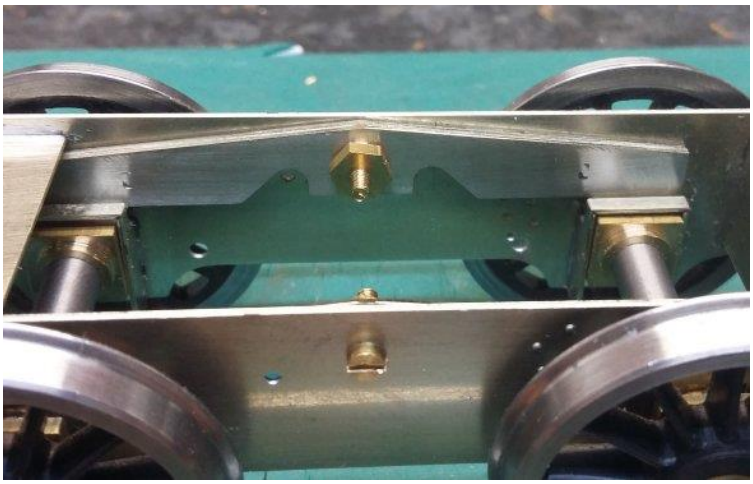
8) Dry fit all the five parts to ensure they all slot together with half etched lines on inside. When satisfied with the fit, lay the chassis upside down on a flat surface and tack solder together. Check that it is still flat and square and solder all joins fully. Check again before proceeding. See below.



9) Remove parts 10 (4 off buffer beam stiffen plates), start by removing the cusp and bend the tabs at 90^0. Lay a pair into corners of the footplate and measure the distance between them, they should be 26mm apart, if not remove material from the long facing sides <u>equally</u>. When satisfied solder into the corners using half etched groove as guide. Offer chassis to footplate to check it fits between stiffeners, there should be about 0.5mm clearance either side.

10) Locate the compensation beam parts 11 & 12 (2 pairs), bend up tabs on 7 and “tin”, place 8 over tabs solder together, file off tabs and deburr all around outside. Note! There should be a slight bulge on each end of the beams where they rest on the hornblocks.

11) Using the 2 pivot bearings and 2 - 10BA x ¼ bolts secure the 2 beams to the chassis. (The beams fit in the slot above each hornblocks). Check that the beams move up and down easily. **<u>DON’T</u>** open out hole in chassis as this will affect rode height and degree of compensation.

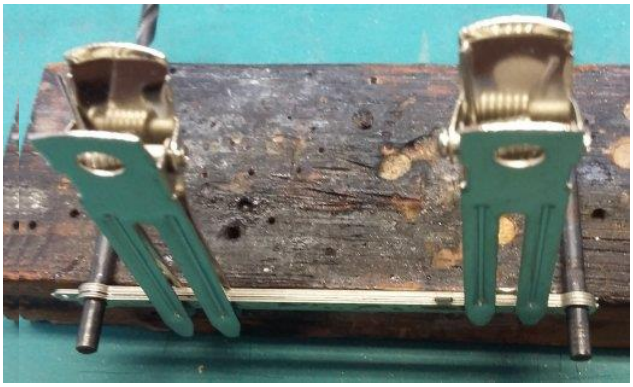


12) Remove 13 (ash pan), clean up and fold into a “U” shape with the rivet detail on the outside. Offer up to the half etched locations on the chassis and adjust to get a good fit, then solder in place, see picture, ensure it is pushed up to the top of the location or it will foul the rear brake stretcher later.

13) Take each slater’s wheel and lay face upwards on a piece of 600 grade, wet and dry and with a circular motion remove and slight pips of plastic left from moulding operation. With an emery stick or similar, **<u>kiss</u>** each of the 4 facets on each end of the axle and then try fitting a wheel to each end. Sometimes you might find the slightest burr in hole in the wheel, if so kiss with a square needle file. *<u>At all costs avoid a sloppy fit.</u>* Now fit the crankpins as per instructions that came with the wheels.

14) Using the bearings (*and washers to reduce side play if needed*) fit wheels and axles to the chassis – *Do Not fit the motor/gearbox at the moment*. When all 3 wheel sets have been fitted, push along the bench or piece of spare track, the chassis should roll freely. If not determine which axle is the problem and correct it.

15) **Before removing parts 14** (coupling rods) read this note fully. The three parts of the rods **should** be cut out as one piece and then using the tabs to keep in line, folded before soldering (*half etch of tabs on the outside of fold*), **do not** remove the cusp at this time. Use "black" 2.5mm drill(s) shank to align the holes before soldering. After soldering the parts together file off surplus solder, cusp etc. until you have a nice solid looking rod. Before joining the two halves of the rods, either coat the "tongue" with a permanent marker pen or smear with super glue and allow time to dry. Both methods should prevent the solder from penetrating the joint, use a piece of 1mm nickel silver wire to form the pin and solder on the back only, trim off excess and clean up.

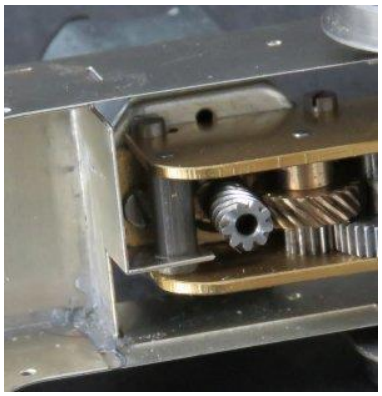


16) Fit bearings to crankpins and try coupling rods, it may be necessary to ever so slightly open holes in coupling rods, if so do it sparingly, sloppy rods = poor running. Don't worry about excess length of bearings at this stage remove excess later, fit washers, retaining nuts and roll along the bench. If there is any binding, identify where and ease the offending hole in rod and retry, repeat until chassis rolls freely.

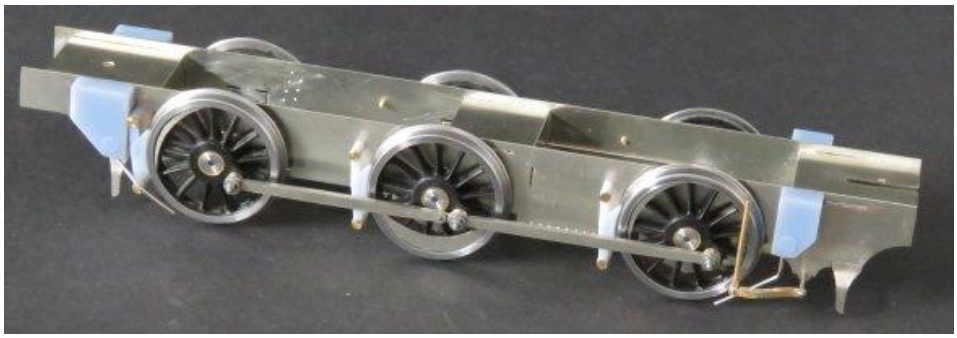
17) Remove 15 (guard irons), the larger ones go to the rear, bend into as per diagram, note the bends go in opposite direction for each pair. Study picture below. Having bent to shape solder into the half etched locations on chassis.

18) Remove the coupling rods and rear set of wheels and fit motor and re-fit wheels and coupling rods.

If you have pair "flying leads", you could now try out the chassis on a piece of track.

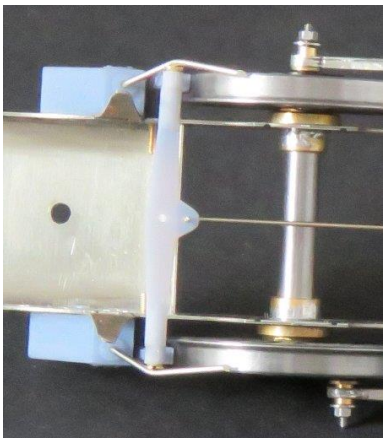


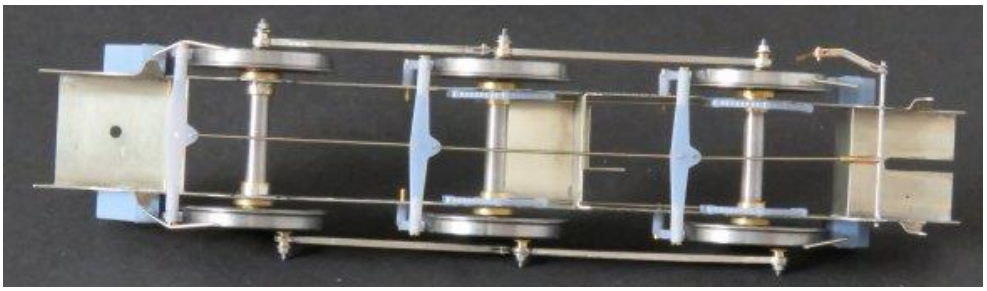
19) There are 2 ways of attaching the Brake Hangers (PP1). a) Solder a piece of 1mm wire (45mm) across chassis through the holes and glue on brake hangers. b) Drill 1.05mm and tap holes for 12BA screws to screw on brake hangers. In either case now is the time to drill and tap or solder in wires.



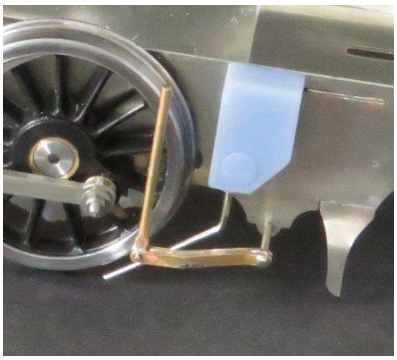
If you intend to screw on the brake hangers, carefully drill top and bottom holes with a 1.4mm drill bit to provide clearance for 12BA bolts. **Temporarily** fit front and rear brake hangers, if not screwing, hold hangers in place with small pieces of blue tack.

20) Now identify the Sand Boxes (PP2 & PP3), large ones to front and small to rear, the boxes have pips on the back which locate in holes in chassis. Tacking 4 pieces of 1mm wire form sand pipes which fit into the holes on the bottom of each box, run a 1.1 or 1.2mm drill down the holes to ensure the wire will fit and the super glue can penetrate. The rear two are easy, requiring just one bend, the front are more complicated. They need to come out and wrap around the front brake hanger see picture.





21) Take a piece of 1mm wire, 42mm long and ensure to thread parts 8 (x2) on as you go, fit through brake rod brake holes on rear of chassis. Solder right end (looking from the rear and top) with 1mm poking through to outside of chassis. Now take parts 16 (x2) and bend as picture below.



Next take the piece of 1.4mm brass wire that has the crashed end and drill a 0.7 hole in the crushed end. Solder a short length of 0.7mm wire into the hole in one of the part 16, thread on the brass wire and the other part 16 and slide whole assembly onto the 1mm brake rod. It's a good idea to have sliver of scape etch to keep parts 16 evenly spaced apart.
Solder brass rod and parts 16 together with lever pointing down slightly and brass rod vertical and with rod 12mm from side of chassis. Solder parts 17 with a 0.9mm gap between the brake rod operating crank, facing forward.

22) Take brake stretcher bars (PP4) and either glue in a short length of 1mm wire or drill 1.05mm and tap 12BA each end of stretcher. Fit stretchers between brake hangers. Using lengths of 0.7mm wire bend to length 3 pieces to form pull-rods and glue in place on stretchers. If you have screwed on your brake hanger, you can remove them as one assembly when you decide to paint.

23) Pickups – If you are not fitting plunger pickups, the easiest option, then you will need to glue some pieces of copper clad strip onto the chassis for later use to enable you to secure the wire you use for "wiper" pickups.

24) Taking the 4 under-slung Springs (PP5) glue into place, there are pips on the springs and holes in chassis for location.

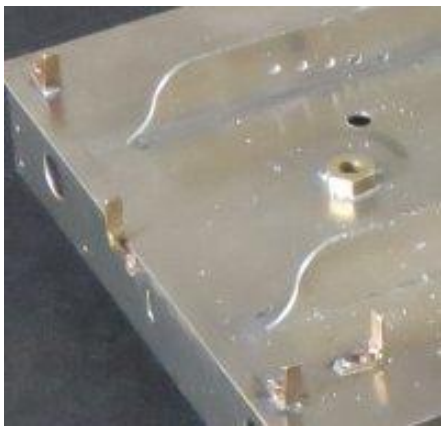
25) Having tested the fit with the footplate you can remove brake hangers, wheels, bearings and motor/gearbox. The chassis is now ready to paint.

26) Depending on your chosen loco you may or may not need to use the weights with the holes in (always have a photo of your chosen loco. Cut out parts 18 (balance weights) and clean up, glue to wheels in correct position relative to the crankpin. Either mask wheel tread using maskol or similar and paint the whole of the wheel front or just paint the balance weights.

27) After painting re-assemble and ensure everything moves freely. Fit your wiper pickups or plunger type and wire up to the motor and test your chassis runs smoothly.

28) **IMPORTANT** - There are hexagonal half etched locations at each end of the footplate, solder an 8BA nut into each.

To prevent the solder from going up the thread, coat the end of a cocktail stick in light oil and screw on the nut. Pass the stick through the hole after fluxing the recess and apply solder – this is where I use Rosen cored electrical solder for the added strength. See picture right. ***NOTE*** *Now is a good time to check the chassis fits.*

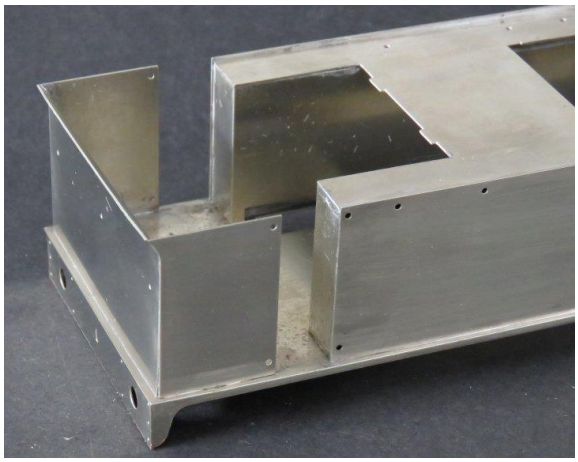


29) Remove 19 & 20 (inner tank sides) clean up, *do not remove location tabs* and fold. With the footplate supported on a block of wood or similar to prevent bending, fit to location slots and if needed clean out slots, when satisfied tack into position.

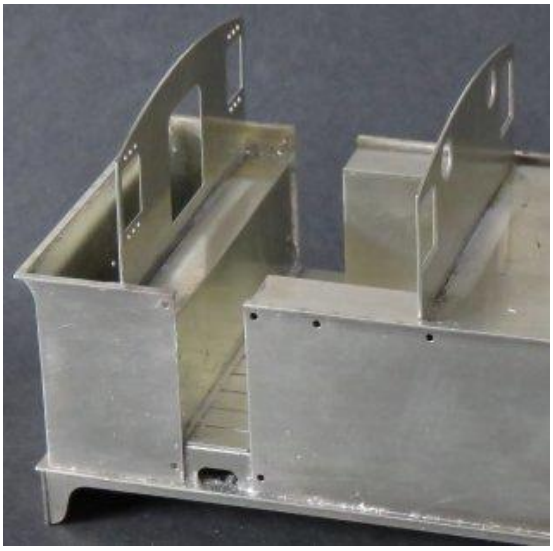
30) **Before** removing 21 & 22 (outer tank sides) from the fret look for the arrow marks near the front end of each piece. Lightly mark a line between each pair of arrow marks which indicate the start of bend of tank side. Remove and clean up as before but avoid removing your bend line. Bend the tank side around a piece of rod of 3mm diameter making sure you keep the bend at a right angle to tank base. Because of the etching process the tabs might be a little long and protrude below the footplate and show on finished model, check and remove excess before fixing. Now is a good time to drill the holes for the tank front handrails, pre-formed centre marks indicate where to drill. When satisfied offer tank sides to footplate and when they sit right, tack solder, check all is square and upright, if so complete soldering of both inner and outer tank sides. Because the printed parts lack weight, now is the perfect time to add some ballast in the tanks, Lead sheet is perfect and I list elsewhere how to obtain some.

31) Remove 23 (tank top) from etch - this fits inside the tank sides and on top of the inner – tack solder in place. Check that footplate is flat and not twisted, if not correct it, when satisfied solder in place fully and check again.

32) Remove 24 & 25 (bunker rear & sides) clean up roll top edge of bunker rear to the same profile as the bunker sides. The handrail holes are above the lamp bracket pockets. Dry fit the parts to ensure they line up and if so tack into place on the footplate. Make sure that the sides are aligned with the tank sides by placing a steel rule along the side of both, adjust if necessary and then solder fully. Your model should look like picture on the right.



33) Remove 30 & 31 (tank top beading) clean side with groove whilst still attached to etch. Carefully clean of the cusp on the inside of each by gripping in a vice whilst working. The outer can be done later when fitted to tanks. Fit beading to tank top and solder in place, when complete trim of surplus at each end. Now very carefully remove outer cusps, file in a direction that pushes the beading on to, rather off the model.



34) Repeat for 32 (bunker top beading).

35) Remove 26, 27 & 28 (cab front, rear & floor), take 22 the cab rear and make the 2 folds and check that are at 90^0 to each other. Carefully form rivets down each side of cab front.

36) Fit 47 (window bezels) to cab front and rear windows and 48 (cab rear door surround) 49.

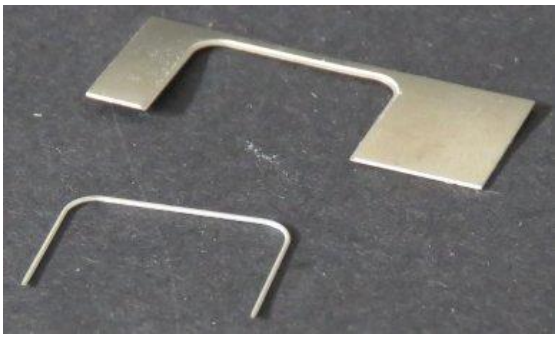
37) Using pieces of 0.7mm wire bend and fit rear window protection bars, file flush on inside when complete.

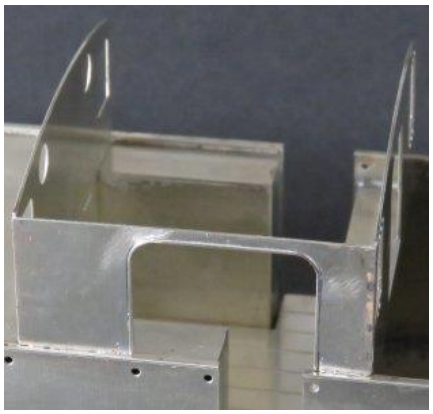
38) Fit cab front into slots on footplate and floor into slots in cab front, lastly try cab rear into slots in footplate whilst locating rear of floor in cab back. The cab front and back should be vertical, keep in place by pressing a small piece of blue tack on each side between cab back and bunker side.

39) Remove 29 (foot recess) clean cusps and bend at right angle. Place in doorway on floor they should be the same length as the gap between tank rear and cab back, fettle to suit. Remove cab back, front and floor and solder foot recesses in place, against tank side and bunker side. Study picture.

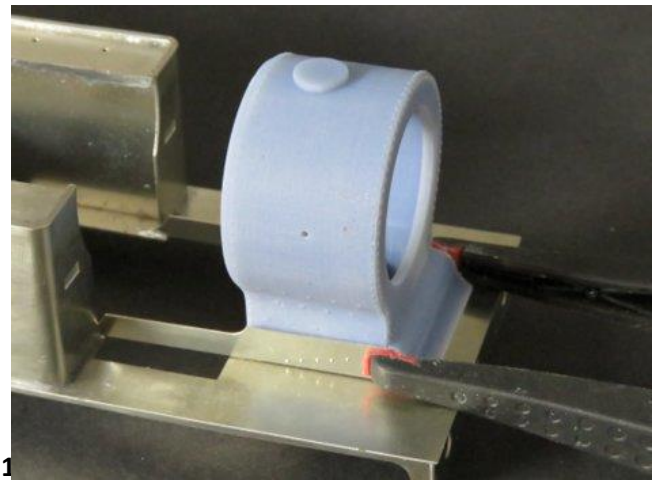
40) Re-fit cab front, floor and back ensuring not to distort the body and solder in place.

41) Remove 33 & 34 (cab sides) and 35 & 36 (cab beading). Carefully form rivets down each side at front edge. Check that each side fits with cab front and back, now bend top of cab side over to the same angle as cab roof i.e. so as not to foul roof. Then solder beading to cab opening and the sides to cab front and back, check cab is square or it will affect fit of roof.





42) Take the Smokebox (PP5) and clean up if required **mind the rivets**. Enlarge 2 holes in underside to 1.05mm and tap 12BA and bolt to the footplate.



43) Remove 37 and 38 (frame extensions) Carefully clean up and form rivet detail. Using a suitable clamp as in picture on left, clamp 37 & 38 alongside the smokebox saddle. When satisfied with the position of these solder to the footplate at back end inside the tanks. Mark with a pencil the position at the front end, now remove clamp and smokebox. Solder front ends to footplate on the inside making sure they don't move, remove any surplus solder and check that smokebox saddle just slides in, adjust if needed, *and check that everything is still flat and square.*

44) Remove 39 (x2) (tank front steps) clean, bend and solder to tank front into half etched pockets, flange uppermost.

45) Taking 40, 41, 42 & 43 (steps & back plates) Form rivets in steps and back plates, then form folds in all parts. I personally like to solder steps to back plates with Rosen cored solder and then fix assemblies to footplate with 190^0 solder, this I find gives a strong bond whilst not having the steps fall off during the process. When you have made up your 4 sets of steps, solder to the underside of footplate in the half etched pockets provided.

46) Part 44 (boiler barrel) the boiler barrel has been pre-rolled and all that remains is for you to solder along the bottom joint. If you haven't any strap clamps then either a couple of large jubilee clips or some large strong elastic bands should suffice to keep the joint tight together. There's little or no strength in a butt joint, therefore I cut a thin slither of waste and solder it over the joint on the inside. When complete check that it is round. Offer to smokebox it should be a snug fit and the location lug will ensure the boiler has its holes top dead centre.

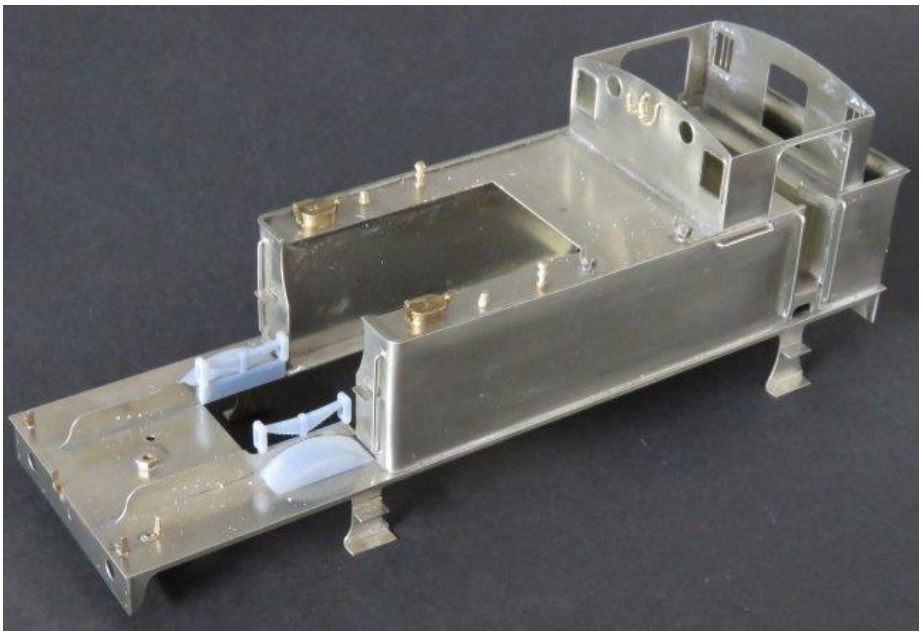
47) Part 45 (boiler band strap) this should be fitted directly over the boiler band at the rear of the dome.

48) Identify the Firebox Front (PP6 "U" shaped) and Firebox Top (PP7) place PP7 on to the tank top in front of the cab and drop PP6 down through the tank top front of PP7. PP6 should locate in PP7 and the firebox top should sit flush on tank top. If the front holds the top high and produces a gap trim the legs evenly a little at a time until a perfect fit is achieved. Now fix Smokebox, boiler barrel and firebox together to form a unit as in the picture on page 11.

49) Safety Valve C1 Dome C2, Top Feed C3 and Chimney C4 can now be glued on to this assembly.

50) Take C5 (whistles) and bend as picture and solder into front of cab.

51) Solder or glue C6 (tank fillers) into tank top, repeat for C7 (tank lid stops) and C8 (tank vents).



52) Remove parts 46 (fire iron brackets), fold double and solder together, carefully remove cusps and fit into the two remaining holes on tank top.

53) Fit Hand brake handle in the smaller hole in left tank top.

54) Remove 50 (cab doors) and decide if you are going to have them open or shut (easiest) and after cleaning up and fettling to fit, solder or glue into place. Note they have little legs to keep them proud of the floor.

55) Fit C9 Reversing lever to floor on right side of cab.

56) Remove 51 (cab roof) and 52 (roof braces) and clean up (Note! It is best try braces the braces aren't too long). Carefully roll the roof to match the profile of the cab front (back) avoiding any creases. With roof upside down solder the braces into the half etched grooves making sure they central and at 90^0 to the roof. Offer to cab, the braces go on the inside, if necessary adjust until it fits and that the overhang is equal front and back and the same at the sides. Hole is towards the back.

57) Remove 53 (roof vent) clean up and roll to same profile as the roof. Fix on to roof with door to the front. DO NOT FIX ROOF.

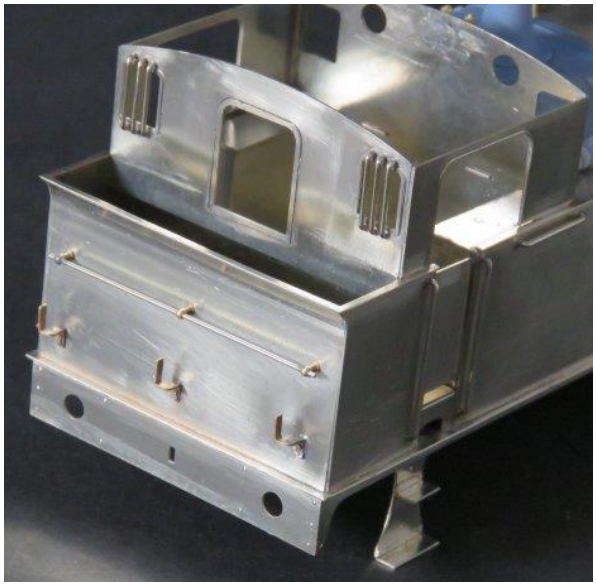
58) Remove 54 (roof drip strips) Very carefully clean up without bending or distorting and fix to roof as shown in pictures. DO NOT FIX ROOF.

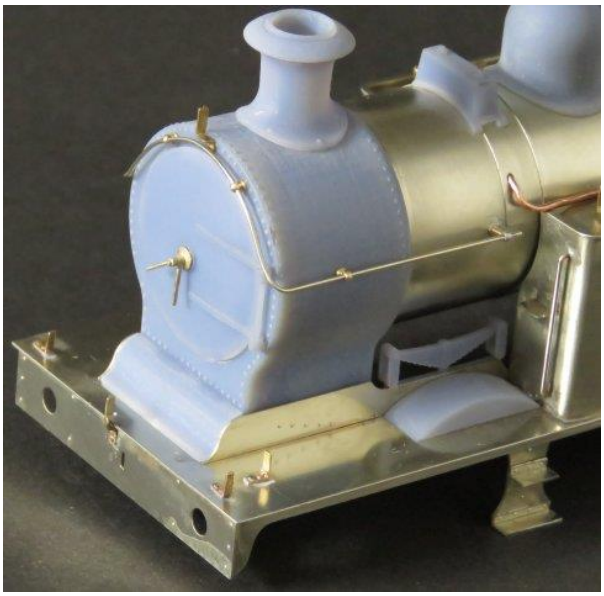
59) Remove 55 (cab shutters x2) and set aside.
From the 1mm square brass channel cut 4 lengths 24mm long. With the roof in situ offer a piece up under the roof overhang scribe or mark with pencil the lower edge. Remove roof and with channel facing the footplate and 2mm from front of cab solder in place using previous marked line to determine vertical position.
Take a second piece of channel and with the channel facing upwards place on tank side tight under beading. With the front end in line with upper one fix to cab side.
Take shutter and slide into channels, if need be carefully reduce height until it fits. Repeat for other side and check that roof still sits snugly onto cab, then put cab roof out of harm's way.

60) From 0.8mm wire form 4 cab handrails and fix in place.

61) From 0.7mm wire form 2 tank side handrails and fix in place

62) Fit 3 short handrail knobs in bunker rear and fix a 52mm long piece of 0.8mm wire to form handrail.





63) From 0.7mm wire form the 2 handrails for the tank front and fix in place.

64) Locate C10 (lamp brackets) clean up and fix into the pockets on front of footplate. Take the twisted one and fix to the front buffer beam 3mm off centre and to left as look at the loco, refer to picture.

65) Remove parts 57 sand box fillers, 2 bits for each and fix to the footplate directly above front sandboxes.

66) Locate C11 (bunker lamp bracket) clean and fix into pockets on bunker rear.

67) Take part PP12 (smokebox door) clean and drill a hole in the centre to accept C12 door handle. Now fit into smokebox front and make sure the hinge pin is vertical. Glue into place when you are sure it is right. Now glue door handle in place, inner arm must be vertical and hanging down.

68) Locate part C13 (smokebox lamp bracket) clean up and attach to the top of smokebox front ring.

69) Take a length of 0.7mm wire and form the front hand rail, there are 4 short handrail knobs and 2 long, these go on the boiler sides. Note the handrail stops short of the tank fronts. When satisfied with the shape glue knobs and handrail in place.

70) Glue front over-springs (PP13) to inside of frame extensions, they are meant to be deeper than frames.

71) Clean up front wheel splasher (PP14) and glue in place against frames and footplate.

72) Now fit the smokebox boiler assembly into the body, screw and glue into place.

73) Having detailed and painted boiler back head, fix in place in the cab.

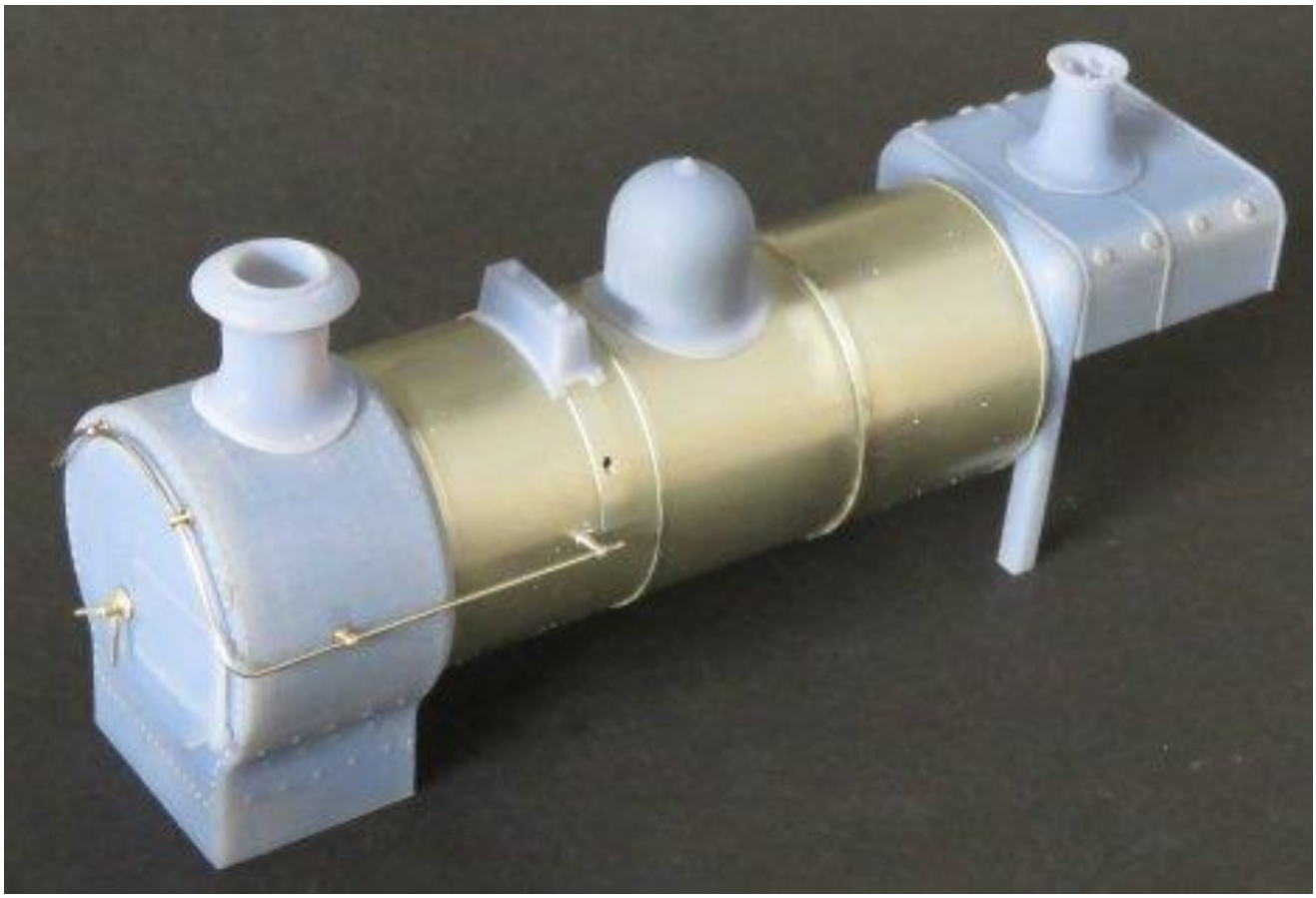
74) Take valve chest cover (PP15) and glue in place between frame extensions and in front of smokebox.

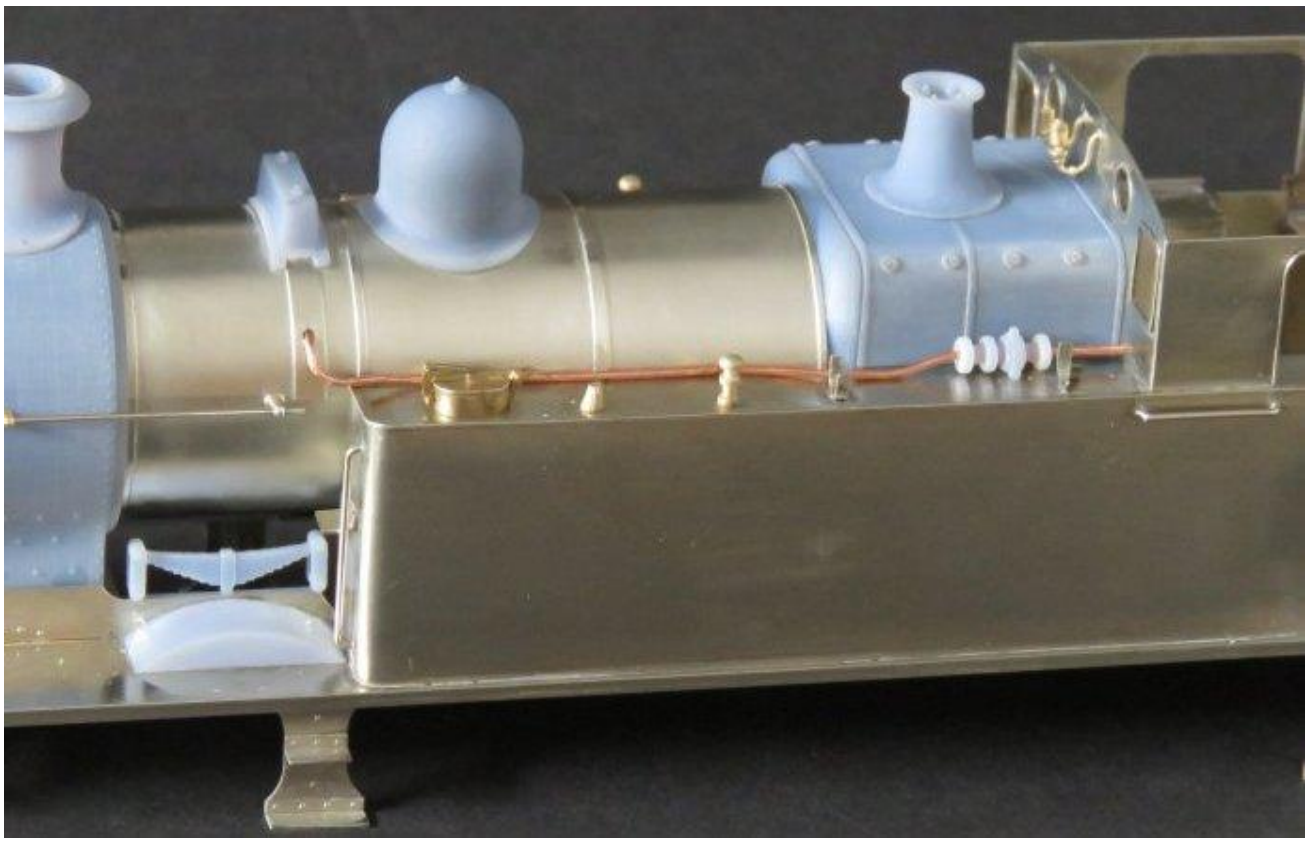
75) Taking a length of copper wire form the top feed pipes. The injector PP16 is fitted between the 2 pieces as shown and the end is feed through the hole in cab front. Refer to pictures.

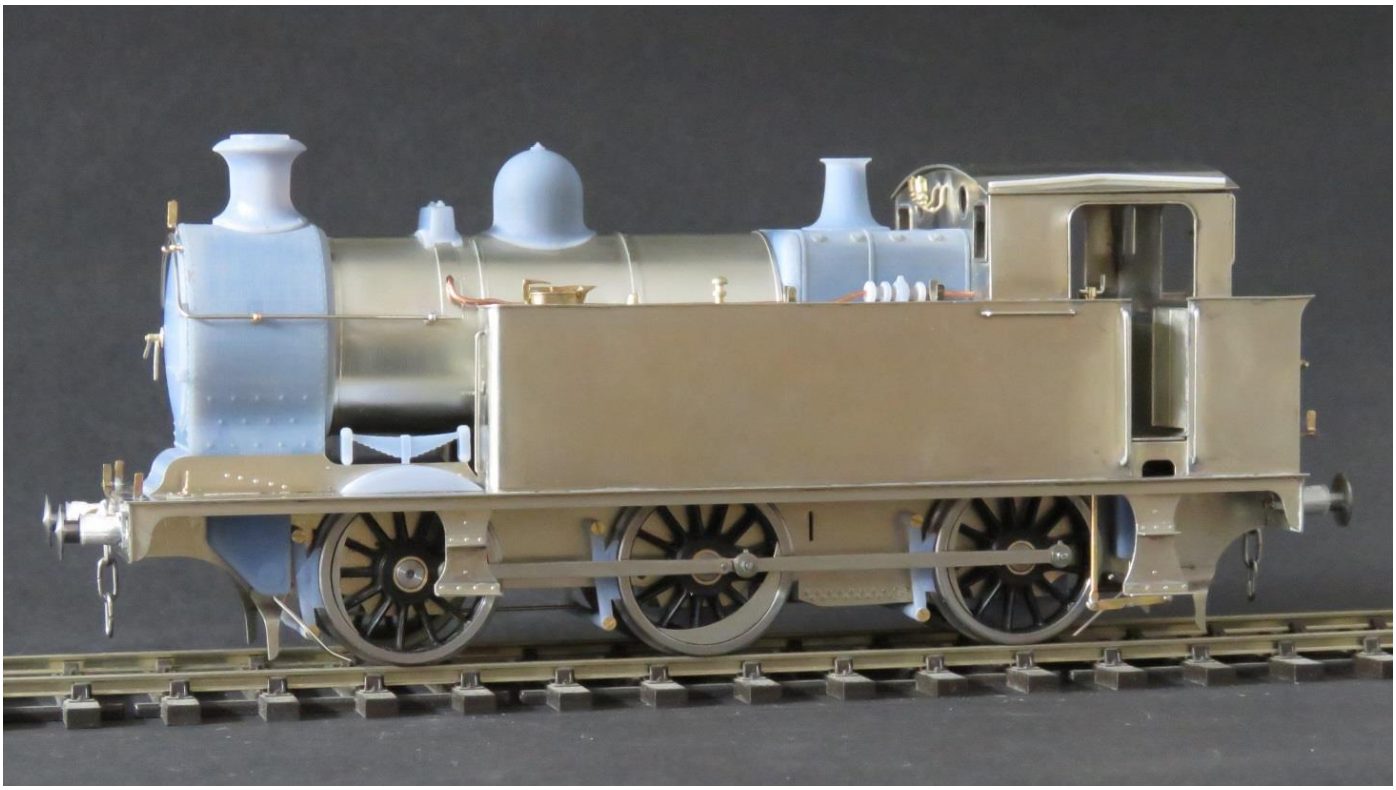
76) Fix buffers and coupling hooks in holes in buffer beams.

77) Paint the body, decal and number.

78) After re-assembling the chassis, bend over the tabs to hold the hornblocks in place.







Pre-production Test Build

Tool Kit

Generally speaking it is better to a few quality tools than a barrow load of cheap ones. I appreciate most of us don't have endless budgets, but good tools I bought 50 years ago still serve me today!

a) 80 watt temperature controlled soldering iron with bits
    a. Antex
    b. Weller
    c. Ersa
b) Flux pen & liquid flux
c) Files 150mm Flat
    a. No3
    b. No5
d) Files 200mm Flat No3
e) Files 150mm Half Round
    a. No3
    b. No5
f) Files Needle 150mm No4 or No5
    a. Round
    b. Square
    c. Flat
g) Riveting tool, *this is an you should skimp on*
h) Good quality "side" cutters
i) Smooth jawed pliers
j) Tweezers
k) Self-gripping tweezers
l) Forceps
m) Cheap plastic clamps
n) Scalpel & blades
o) Small hammer
p) Pin Chucks 0-1, 1-2 & 2-3mm capacity.
q) Drill bits 0.7, 0.8, 0.9 1.0, 1.05, 1.4, 1.8, 2 & 2.5 as minimum
r) A set of broaches
s) 1.27mm allen key (for slater wheels)

Suppliers

MSC – www.mscdirect.co.uk	Drills
Cousins – www.cousinsuk.com	Files (swiss)
Squires - Squires Tools	General bits and hand tools
Lee Marsh - Lee Marsh Models	Rivet press
Blundell - Ersa Icon IC1100-A Single Solder Station	
MetalSmith - MetalSmith Ltd	Wire, tube etc.
NMRS Models - NMRS Models	Backheads, buffers etc.
ABC Gears - ABC Home	Motor/Gearbox etc.
Coastal DCC - Coastal DCC	DCC equipment

Lead for weighting – although Lead strip is supplied in 6 metre lengths most roofing supply companies cut to the nearest metre, so pop in to yours and throw yourself at their mercy, most are really helpful.