EFE Hunslet 'Austerity' Tank/LNER J94
2FS Conversion Notes

This kit is designed to file the EFE Rail N Gauge Hunslet 'Austerity' Tank locomotive, also known as the LNER/BR J94 tank, produced from c 2023 onward.
Before you embark on this conversion you are advised to check that the locomotive runs well in its N Gauge form, and it is also recommended by the manufacturers to run the loco in each direction for about an hour at medium speed.

In addition to this etch, you will need -
3 pairs 8.5mm driving wheels
6pcs Turned Phosphor Bronze Frame Bushes
6pcs 8BA Brass Washers
1 Geared Conversion Muff for Farish Locomotives
2 Plain Conversion Muffs for Farish Locomotives
1 M0.3 (Fine) 20T 3.0mm Bore Brass Spur Gear
6pcs Crankpins

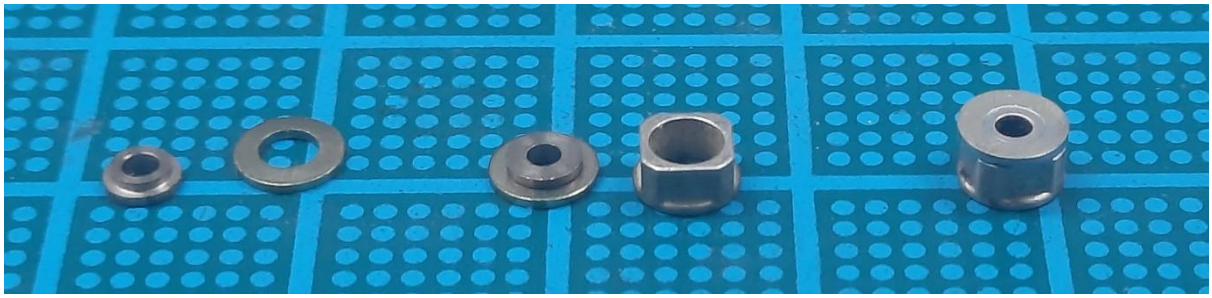
Tools required
Small "Phillips" screwdriver
Tweezers
Fine flat and triangular files
Soldering iron and solder
2FS Back-to-back gauge
Small drills and pin chuck
Fine wet and dry paper.
Epoxy adhesive
Paint etc.
Association quartering jig (optional)
Quartering Jig spacing shims (optional)

Preparation
Some preparation work is required on the wheels before assembly work can start; check that the
2FS wheels fit the axle bearings – the stub axles should enter the bearings easily and rotate freely. if
not, check the size of the axle (they should be 1.5mm diameter) and the bore of the bearings.

Loco Disassembly
As a first step the EFE Austerity Tank should be disassembled ready for fitting the replacement wheelset.
There are a lot of small parts involved, particularly screws, so it is advised to disassemble this locomotive in a tray to avoid losing parts.
Remove the screw retaining the keeper plate at the smokebox end of the loco

Unclip the keeper plate from the chassis, a pair of tweezers can be used to help lift keeper plate where it clips into the chassis block.
Removing the keeper plate exposes a screw beneath the cab that secures the chassis block to the
Remove the screw in the chimney retaining the saddle tank.
Remove the two screws beneath the bunker securing the cab to the footplate, lift the cab away.
Remove the saddle tank moulding.
Remove the screw at the firebox end of the boiler securing the boiler to the chassis block.
Lift the boiler away, and the chassis block can be gently eased away from the footplate. The screw that secures the wires to the DCC socket PCB can be released, allowing the plastic plug securing the other wire to the opposite side of the chassis to be removed, allowing the phosphor bronze connecting tags to which the wires are soldered to be detached from the chassis.
Once this is removed, the wheels can be eased out, complete with bearings, from the chassis.
The wheelset will need to be dismantled as the bearings will be modified to accept 2FS wheels, so if needed note the position of the balance weights at this stage.

Bearings Assembly
The first stage in preparing the bearings to take 2FS wheels is to dismantle the wheelsets by pulling each pair of wheels away from the central stub axle which plugs into each wheel.
Once the bearings are separated, put them to one side.
The bearing inserts are made from an association phosphor bronze frame bush soldered into an 8BA washer. One side of the washer should be tinned with solder and then the bearing and washer should be soldered together, with the inner flange of the bearing sitting in the washer.
Next, prepare the outer, square, ends of the EFE bearings by turning a triangular file inside the bearing to ease out the EFE bearing to allow the washer and phosphor bronze bearing assembly to be a close fit inside.
This picture shows the sequence of assembly –

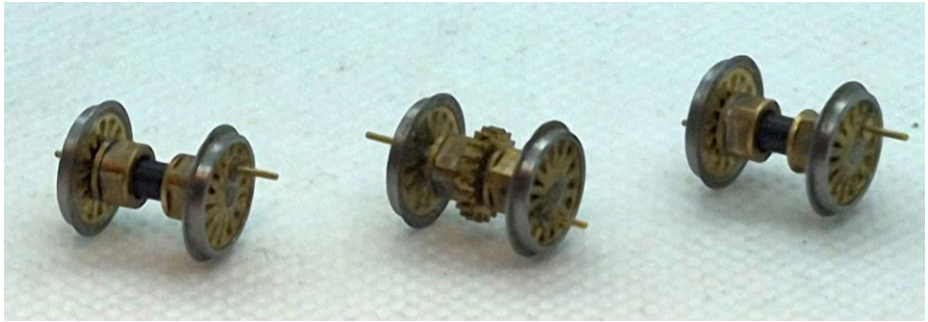


Coupling Rods
The association Austerity/J94 tank coupling rods etch includes coupling rods and balance weights designed to fit the EFE Chassis.
The sheet contains three sub-sheets, one for each coupling rod and one for the balance weights.
The rods are built up from a layered etch held in a frame that folds in a ‘zigzag’ fashion to build up the coupling rod.
On each rod, firstly tin with solder the top side of the first layer – this will be the plain, non-fluted full-length rod nearer the edge of the frame, when heat is applied the rod may momentarily bend in the etch – it will return to the correct size as it cools down.

Next, at the other side of the etch tin the backs, the non-etched sides, of the axle bosses. Fold up the etch frame, bending with the etched fold lines on the outside of the folds, as indicated on the etch. The holes in each layer of the coupling rod should match up.
To join the three layers together, apply a hot soldering iron to the back, the non-etched side, of the coupling rod. The heat should 'sweat' the three layers together; however, it is advised to apply extra heat with the iron around the three coupling rod bosses to ensure they are fixed to the main rod.
Once it has been checked that all three layers of the etch are joined together, the rods can be removed from the supporting part of the etch by cutting through the tabs that join the rods to the rest of the etch. The washers, which are also mounted on the coupling rod etches, do not need to be removed at this point.

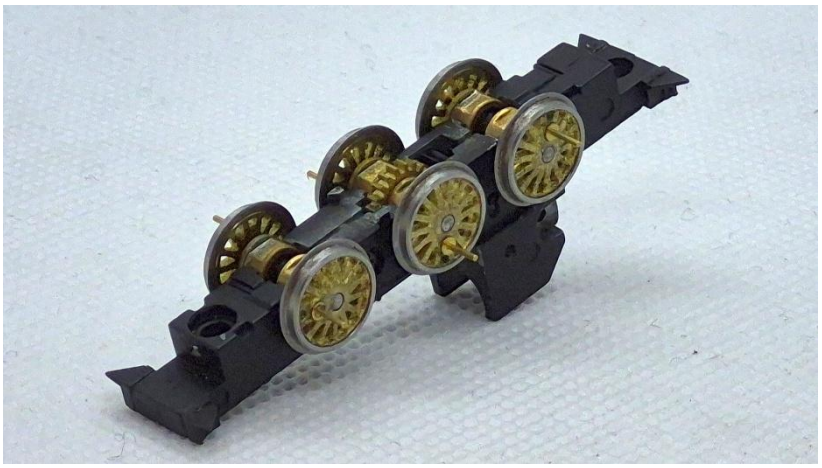
Assembly

Firstly, fit the crank pins to the wheels using Epoxy Resin, or Loctite retaining compound to fix the crankpins into the wheels, ensuring any excess is removed before the adhesive sets. The balance weights should then be fitted, using the original N Gauge wheelset for reference on positioning, noting that the centre axle balance weights are larger than the outer axle weights. Once the crankpins and balance weights are fitted, the wheels can be painted.
The centre wheelset is geared, using a larger 20t gear than that used for the Farish Jinty. The 15t gear supplied fitted to the geared muff should be removed.
The 20t M0.3 gear should first be prepared for fitting – ideally this gear should be thinned down to 1mm thickness by holding the gear flat against a fine bar file and then gently rubbing the gear on the file to reduce width, ensuring that the gear is kept flat and both sides of the gear remain parallel to each other.
As with most gears, but especially in this case, the gear should be 'de-burred' before use by cleaning between each gear tool with a folded piece of fine wet and dry paper.
Next, the 20t M0.3 gear can be fitted. On the geared muff, there is a 'lip' at one side of the 3mm diameter section where the gear is fitted, and this should be noted when fitting the new gear to the muff. The gear should be a firm fit, if necessary secure it with epoxy or retaining compound.
The wheelsets can now be assembled, and an association quartering jig can be used in this part of the process, this will ensure that the crankpins are at the correct 90 degrees to each other.
When assembling each axle, firstly insert each wheel into the conversion bearing, then insert the wheels and bearings into the muff. It may be necessary to use an appropriately sized drill or jeweller's broach to lightly ream the muff
If using a quartering jig, the wheelset should now be placed into the jig, with a shim inserted between the back of the wheel and the bearing. Use the jig to ensure the wheels are correctly oriented and use the jib to press the wheels in, ensuring that the muff stays as central as possible without the stub axle of one wheel being inserted further into the muff that the other. A 2FS back-to-back gauge should be used to ensure that the correct back-to-back measurement for each wheelset is attained.
Once assembled, the three wheelsets should look like this –



The wheelsets should then be fitted into the chassis block, the EFE bearings tend to be a firm fit into the chassis block so they may each need gently pressing home.
The coupling rods can then be fitted, initially securing them with a piece of wire insulation to check fit, before soldering on the crankpin washers and trimming the pins down to size. On the rear wheelset special care should be taken to ensure that the crankpin is cut back so as not to foul the injector pipes beneath the cab.

When fitting the crankpin washers, which are included on the coupling rods etch, the washers on the leading axles can be fitted in situ with the wheels in the chassis.
Once the axles are fitted to the chassis block, this is how it should look – if not already done, the wheelset should be painted at this stage.



The loco can then be re-assembled, by reversing the procedure described for disassembly. Once complete, the completed loco should look like this –