

**C404 – GWR 7' 0" + 7' 9" Coupling Rods (later type) – with the joint in the trailing rod**

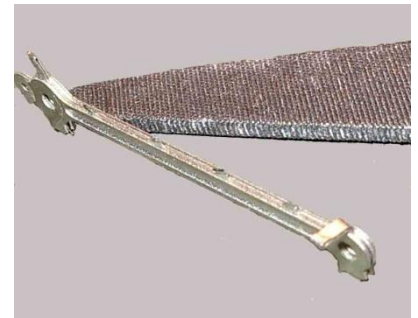
These rods were used on the following classes:

Hall – from 5901  
Grange  
Manor  
Modified Hall  
43xx  
93xx

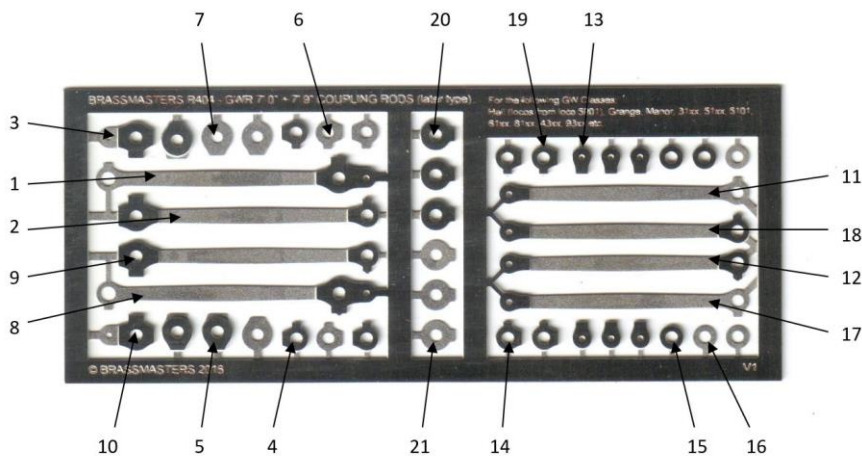
These etched rods are designed for fitting to models with Alan Gibson, Ultrascale and Markits wheelsets. They can also be fitted as replacements on Hornby and Bachmann locos with a small adaption.

Brassmasters also produce the early type of 7' 0" + 7' 9" coupling rods for Saints and early Halls up to 5900 (ref C403).

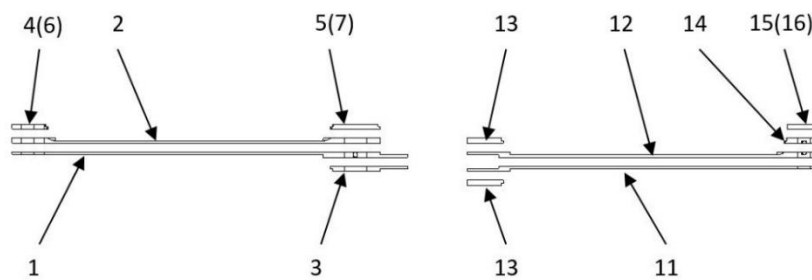
1. Each side is manufactured from four etches and hinged behind the second crank pin, plus a number of overlays for the bosses. The prototype rods have quite a complicated arrangement, and the model rods replicate this. You are advised to study the diagrams at the end of the instructions to ensure correct assembly.
2. The prototype rods have very thick bosses connected by what appears to be very thin rods. The fret includes all the layers to represent the prototype but some builders may prefer to use rods with thinner bosses. Half etched rear layers have been included to allow for this. Note – spares of most of the smaller components are provided on the etch, so don't be surprised when you have unused parts left at the end.
3. Cut the leading left hand rod outer [1] and the leading left hand rod inner [2] from fret.
4. If using Markits wheels, find the largest drill that will pass through the crankpin holes; if using the original Hornby wheels, Alan Gibson or Ultrascale wheels, open the crankpin holes using a 1.5 mm drill. When complete drill a hole using the same size drill perpendicular in a scrap piece of wood. Leave the drill in the hole in the wood. Tin the mating surfaces of a pair of coupling rods and place over the drill. This holds one end of the rods accurately ready for soldering. **It is critical to align the two halves exactly**, in order to make one rod, so take some time tweaking. See photo.
5. Now take the leading left hand rod trailing boss front overlay [3] and solder to the outside of the trailing boss.
6. For the full size boss parts [4] and [5] can be added to the back of the leading and trailing bosses respectively. Parts [6] and [7] provide a half etched alternative for a thinner boss. Using the appropriate bosses, apply each boss holding it in place with a cocktail stick and solder in place using the same technique as for joining the rods.
7. Place a little flux along the top surface of the rod and apply heat; the solder on the soldering iron will run down between the rods and join them. The secret is to apply only a little solder at a time. Solder will fill the "cusp" and give the impression of a solid rod. Repeat for the whole length of the rod. Clean up and square off each rod with files.
8. Repeat for the right hand front rods [8 – 10] + [4] and [5]. (Again parts [6] and [7] are used for the thinner boss).
9. Next take the trailing left hand rod outer [11] and the trailing left hand rod inner [12] and solder them together.
10. Solder a trailing rod fork overlay [13] to the outside and inside of the leading forked end of the rear rod.
11. Solder a trailing left hand rod rear inner trailing first boss [14] to the back of the trailing boss, followed by the trailing left hand rod rear inner trailing second boss [15]. Part [16] can be used in place of part [15] for a thinner boss.
12. Repeat for the right hand trailing rods, rod outer [17], rod inner [18], fork overlay [13], inner trailing first boss [19], and inner trailing second boss [15] (again part [16] is used for a thinner boss).
13. File the stepped end of the fork overlays so that they blend into the face of the rod. Clean up the rods paying particular attention to the joints.



14. These etches are for the type of rod with round bosses. The best way to achieve a smooth flare is to use a small round file and file in the step between parts e.g. parts [1] and [3]. Once the flare is formed then the file can be worked round the boss to give a circular boss.
15. Each set of rods has a knuckle joint to manufacture. The rods are joined with a small rivet pushed through **from the front** leaving about 0.2 mm proud. If there is excessive solder between the rod layers the rivets will not project, in this case countersink the back of the rods and this will allow the solder to reach the rivet.
16. To stop solder flooding the joint, apply a little oil to the surfaces not to be soldered - this will prevent the solder running into the joint. Keep the rear of the rod clean. Solder can then be quickly applied with a very hot iron to the back of the rod to fix the rivet in place. Clean off excess solder leaving enough to keep a strong joint. See photo below of completed rods.
17. Open up the crankpin holes in order that the rod will either rotate on the crankpin screw (if using Markits wheels) or on the crankpin bushes (if using Alan Gibson or Ultrascale wheels). This can be done with a reamer, broach or a fine Swiss file.
18. If the rods are being used on a ready-to-run model, e.g. Hornby Hall, and replacement connecting rods are not being used, part [20] can be fitted to either side of the big end to increase its width. For a thinner boss, part [21] can be used on the inside of the boss.



Left hand side



Right hand side

