

HAWKSWORTH TENDER – PROTOTYPE NOTES AND INSTRUCTIONS

1 Introduction

1.1 The purpose of this booklet is to guide the modeller in the building of the Brassmasters 4mm/ft scale kit of the GWR Hawksworth 4000 gallon 8'0" wide tender. The prototype information is not, and was not intended to be, a comprehensive history.

2 Prototype Notes

2.1 F W Hawksworth introduced the flat-sided tender to the GWR with his 'County' class 4-6-0 locomotives of 1945. These 30 tenders were 8'6" wide, with a capacity of 4,000 gallons of water and 7 tons of coal, and weighed 49 tons full, 22 tons 14 cwt empty.

2.2 107 examples of the 8'0" wide version was also built, and paired with some members of the 'Castle' and 'Hall' class 4-6-0s. 'Star' No. 4062 was also paired with one in 1950. The full weight was lighter than the equivalent for the wider tender, at 47 tons 6 cwt, but the empty weight was heavier, at 23 tons 5 cwt. These tenders also carried 4,000 gallons, but the coal capacity was reduced to 6 tons.

2.2 The 8'0" tenders were built in 8 lots, as follows:

| Lot No. | Swindon Works Numbers | Date Built |
|---------------|-----------------------|-------------------|
| A182 | 4000 - 4009 | 10/1946 - 12/1946 |
| A187 | 4030 - 4049 | 10/1947 - 4/1948 |
| A188 | 4050 - 4069 | 5/1948 - 8/1949 |
| A189 | 4070 - 4098 | 11/1948 - 5/1950 |
| A190 | 4099 - 4108 | 5/1950 - 8/1950 |
| A191 | 4109 - 4118 | 9/1950 - 11/1950 |
| A192 ((part)) | 4119 - 4126 | 11/1950 - 2/1951 |

2.3 Tenders of lots A182, A188 and A190 were allocated to new 'Castle' class engines as they were built, as follows:

| Engine Lot No. | Build Date | Running Numbers | Tender Lot No. | Tender Wks Nos. |
|----------------|--------------------|----------------------------|----------------|-----------------|
| 357 | 5 - 7/1946 | 5098 - 5099 7000 - 7007 | A182 | 4000 - 4009 |
| 367 | 5/1948 - 8/1949 | 7008 - 7027 | A188 | 4050 - 4069 |
| 375 | 5 - 8/1950 | 7028 - 7037 | A190 | 4099 - 4108 |

The other tenders were fitted to new 'Modified Hall' engines 6959 - 7928, but no details of individual allocations are known. Tenders were swapped around as engines went through works, so some ended up behind earlier members of the 'Hall' and 'Castle' classes - the only reliable source of information is a photograph of your chosen engine.

2.4 The last two tenders, 4127 and 4128, were fitted with coal weighing apparatus, and were used for testing purposes behind 'King', 'Castle', 'County', 'Hall' and 43xx engines as required. 4127 was built in March 1952 (lined green livery), and 4128 in February 1952 (lined black).

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3 Construction - General Notes

3.1 The kit contains the principal components necessary to build the tender. Numbers shown in the instructions in square brackets [] are part numbers. These numbers appear on or adjacent to the parts on the frets. Certain parts, e.g., handrail wire, nuts and bolts, etc., and the castings are not numbered.

3.2 Because this tender is a separate kit it is not possible to provide a form of coupling to suit all the various methods employed on model engines with which it may be paired. The coupling arrangement is therefore left to the builder to determine.

3.3 The tender is designed to be constructed as two units- body and chassis, to facilitate painting. However, it may be built as one assembly if you so wish.

3.4 On the etched components all folds and bends are made with the half-etched line to the inside, except for the bottom sections of the axleguards on frames [38] and [39].

3.5 On some components it is necessary to form rivet / bolt heads from the reverse side by using a punch. We recommend the 'drop punch' as described by John Hayes in 'Model Railway Journal' issue 73 and now marketed by London Road Models.

3.6 The following components are not included in the kit and must be sourced by the modeller:

Wheels: we recommend Alan Gibson's of which you will require three axles of G4849 4'1½" 12 spoke. Please remember to specify the gauge (OO/EM or P4) when ordering.

Couplings. Conventional couplings are available from several sources, the best of which are Exactoscale CH001A screw type. Those using Alex Jackson or other forms of automatic coupling will have their own preferences for methods and materials.

Finishing materials. The following are recommended:

Primer: proprietary aerosol grey primer (available from car accessory shops).

Colours: GWR period - Phoenix Precision GWR post 1945 locomotive green (P11), GWR post 1945 lining orange (P13). BR period - Phoenix Precision BR pre-1954 locomotive green (P100) or post-1954 locomotive green (P101), and BR lining orange (P104). Both periods - Humbrol satin black (85), and buffer beam red (60).

Varnishes: Humbrol Gloss Cote, Satin Cote and Matt Cote (available from Squires).

Transfers: Methfix sheets 7 (GWR) or 14 (BR) from the HMRS.

3.7 Most soldering operations can be performed with 145 degree solder and Carr's 'green label' flux or similar, using a 25 watt iron. The addition of smaller parts such as lamp irons is best undertaken with solder paste and a resistance soldering unit (RSU). We recommend the RSU marketed by London Road Models. To fix white metal castings, first tin the surface of the brass or nickel silver with 145 degree solder, then fix the casting in place with 70 degree solder and 'red label' flux.

3.8 Solder flux is highly corrosive and leaves deposits on the metal surface. At the end of each work session involving soldering, wash the components / assemblies in warm water and gently apply 'Jif' or a similar cleaner using an old paint brush. Rinse the parts thoroughly in warm water and allow to dry. Do not use hot water as this may melt the 70 degree solder. Do this in a sink or basin with the plug in place so that if anything falls off it won't go down the plug-hole!

3.9 Try to keep the amount of soldering in close proximity to the wheels' steel tyres to a minimum. It is recommended that wheel tyres be coated with a thin layer of paint to prevent corrosion during assembly, then cleaned off when construction is complete.

3.10 The terms 'fit' and 'fix' as used in these instructions have definite and separate meanings. 'Fit' means put in place but do not secure, e.g., fit the wheelsets in the bearing units. 'Fix' means secure in place (using solder, adhesive, etc.), e.g., fix the filler dome on the tank top.

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3.11 Reference to the right and left sides of the tender is made from the driver's position, looking forward from the locomotive cab (i.e., looking at the tender from the rear). For example, the fire-iron tunnel is on the left hand side.

3.12 Some of the etched components are delicate and easily damaged, so do take care in handling them. Components should be removed from the fret using a small scalpel and the tabs removed with a small fine-cut file. Any flash on the castings should be removed with a small fine-cut file and the casting polished with a fibreglass brush.

3.13 Separate sheet 'B' contains photographs of the preserved tenders to illustrate the construction, and sheet 'C' shows the assembly of the model's brake and water scoop rigging.

4 Construction - Detail

4.1 Form the bolt heads on running plate [1], then remove the components from within it. Check and if necessary open out the holes at the front and rear to clear a 10BA bolt, then fix a 10BA nut over each hole.

4.2 Fold the tender sides/rear [2] to give a 1mm radius to the rear corners at the location of the vertical handrail holes, then fix into the half-etched location line on the running plate. Remove the components from within tender inner sides [3], and tender inner rear [4], and fix these inside, against part [2].

4.3 Make and fix in place the vertical and horizontal rear handrails (0.3mm wire). Fold up and fix the tender rear steps [5] and lamp irons [6] in place.

4.4 Fix the water gauge [7] to the half-etched recess in the tender front [8]. Fix the coal door bar [9] to the door [10], then the door to the front. Fix the coal doorway surround sections [11] and [12] to the back face of the front. Fix the front in place between the sides, in the slots in the running plate.

4.5 Fold up and fix in place the footplate supports [13] to the running plate, and fix to them the footplate [14].

4.6 Fold up the lockers [15 - left] and [16 - right], and fix to them the doors [17 - left] and [18 - right], and top plates [19], ensuring alignment of the holes for rods / handles. Fix the lockers in place in the corners of the front/sides on the footplate. Fix the water cock cranks [20] on top of the the lockers, aligning the holes for the operating rods. Form and fix in place the water cock handles and operating rods, the locker door handles, and the front (vertical) handrails, all from 0.3mm wire. Fix the water scoop and handbrake handle castings in the holes in the tops of the lockers.

4.7 Form the lateral folds on the tender top / coal space base [21] and fix in place in the tender, locating on the tops of the inner sides and in the half-etched location line on the back of the front.

4.8 Fix the coal space backplate [22] to the slots in the top, then cut and fix in place the 1mm x 1mm brass angle to the top, at the rear of the backplate.

4.9 Fix the lifting eye plates [23] to the half etched locations on the top, followed by the lifting eyes [24], gussets [25], bars (0.3mm wire) over the ventilation holes, and the castings for the scoop dome and tank filler.

4.10 Form the curves in the upper sections of coal space sides [26 - left] and [27 - right] to the profile of coal space side supports [28]. Fix the supports to the coal space sides at the half-etched witness marks, then fix these assemblies in the tender, in the half-etched location lines in the top and front.

4.11 Fix the fire-iron tunnel base [29] in position on the left hand side, so that its front edge locates in the half-etched location line on the tender front. Fix the fire iron tunnel intermediate vertical plate [30] to the half-etched location line in the tunnel base, and the end vertical plate [31] to the half-etched location line at the rear of the base.

4.12 Form the curves on the fire iron tunnel sections [32 - front, 33 - rear] and fix in place over the base. The top edge of the tunnel should be level with the top of the tender side and its bottom edge should meet the coal space side, with the leading edge of the front section locating in the half-etched location line on the back of the tender front.

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- 4.13 Fix the beading strips [34] to the backplate and [35] to the front plate - note that the latter has its 'overhang' over the coal space.
- 4.14 Fix the gussets [36] to the top of the right hand coal space side (at the locations shown by the half-etched witness marks), followed by the castings for the tank ventilator and (to the back of the front) the water gauge back.
- 4.15 Put the body unit aside until later.
- 4.16 Remove the components from within the chassis top [37]. Drill the two mounting holes to clear a 10BA bolt, and the holes in the brake cross-wire supports 0.7mm. Form the bolt heads on the forward step plates. Fold down the pivot section for the leading axle unit, and the side valances / step plates.
- 4.17 Form the bolt / rivet heads in the frames [38 - left, 39 - right], and fold the bottom pieces of the axleguards through 180 degrees. Drill the holes (adjacent to the front footstep position) for the brake crank cross-shaft (lower) 0.7mm and the scoop operating cross-shaft (upper) 0.5mm. Drill the holes for the scoop rear cross-shaft (in the scoop shaft support, located in the frame rear aperture) 0.5mm.
- 4.18 Fix the frames into the slots in the top, then remove any excess tab material to give a smooth upper surface.
- 4.19 Fix the drag beam [40], buffer beam [41], buffer beam upper plate [42], and valance overlays [43 - right, 44 - left] in place.
- 4.20 Form the rivet heads in the end supports [45] and intermediate supports [46], then fold up and fix in place in the half-etched recesses in the frames - note that solder is best applied from the 'inside' of the frames through the holes provided for this purpose. Fold down the brake cross-wire supports.
- 4.21 Fold up the front footstep stay plates [47] and fix between the frame sides (in the half-etched recesses) and the forward step plates.
- 4.22 Fix the front footsteps [48 - upper, 49 - lower] and rear footsteps [50 - upper, 51 - lower] to the half-etched recesses in the step plates.
- 4.23 Check and if necessary file out the slots in the axle units [52 - centre, 53 - rear] to clear a 2mm axle. Fold up and fix the units to the half-etched locations in the underside of the top - note that solder is best applied from the upper side of the top, through the holes provided for this purpose.
- 4.24 Check and if necessary drill the holes 2mm in the front axle unit [54], then fold up this unit and fit temporarily in place over the pivot lugs. Do not fix this in place.
- 4.25 Cut four lengths of 0.7mm wire - one to form the brake crank cross-shaft and three to form the brake cross-wires, and two lengths of 0.5mm wire - to form the front and rear scoop cross shafts.
- 4.26 Drill the holes in the cranks as follows:
- [55] handbrake crank - 0.7mm at shaft end, 0.5mm at other end.
 - [56] vacuum brake crank - 0.7 at shaft end, 0.5mm at other end.
 - [57] brake pull cranks - 0.7mm at shaft end, 0.5mm at other end.
 - [58] scoop front pull crank and lifting crank (one of each) - 0.5mm both ends.
 - [59] scoop rear pull crank - 0.5mm both ends.
- 4.27 Fit the brake cranks [55, 56, 57] to the cross-shaft, then fix the shaft in the holes in the frames, and fix the cranks in their correct positions (see diagram on sheet C). Fix pieces of 0.5mm wire to [55] and [56] to represent the vertical pull-rods to the handbrake handle and the vacuum cylinder, ensuring that the front axle unit can still be removed. (Note that the cylinder is not provided due to the presence of the compensation unit). Remove the front axle unit.
- 4.28 Fit the scoop front pull crank [one of 58] to the front cross shaft, fix the shaft in the holes in the frames, and fix the crank in position (see diagram on sheet C). Fix a piece of 0.5mm wire to the crank, to represent the vertical pull rod.

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- 4.29 Fit the scoop rear pull crank [59] and the scoop lift crank [one of 58] to the rear cross-shaft, then fix the shaft in the holes in the support brackets in the frames. Fix the cranks to the shaft in the correct position (see diagram on sheet C).
- 4.30 Fold up and fix the frame stay plates [60] into the half-etched locations between the frames, and the water scoop casting to the rear stay plate, ensuring that the back of the casting will clear the rear axle.
- 4.31 Fix the axlebox / spring castings to the frames, the buffer bodies to the buffer beam, and the front buffer castings to the drag beam.
- 4.32 Form and fix in place whatever material is required to provide the coupling to the locomotive.
- 4.33 Paint the 'inside' areas of the frames - primer then black - leaving unpainted the areas (a) around the holes in the brake cross-wire supports and (b) the axle slots. Also paint the 'legs' of the front axle unit, leaving the area around the holes unpainted.
- 4.34 Thread two brake shoes / hangers on each brake cross-wire, ensuring that they are correctly handed. Fix the wires in position in the holes in the supports, but do not fix the shoes / hangers yet - leave them loose on the wires.
- 4.35 Make up the centre and rear wheelsets and fit in the axle units. Protect the axles and wheel tyres from flux spatter, (use Maskol, thin paper, etc.) then fix in place the retainers [61 - centre, 62 - rear]. If required, downward springing of the centre axle can be provided using phosphor bronze strip.
- 4.36 Make up the leading wheelset in the axle unit, then fit the unit in place over the pivot lugs and 'tweak' the lugs to retain the unit.
- 4.37 Fix in place a length of 0.5mm wire to form the scoop pull rod between the cranks.
- 4.37 Laminate together the two halves of each brake cross shaft [63 - rear, 64 - centre, 65 - front] and drill the holes 0.5mm for the pull rods. Trim the ends, then fit to the brake shoes / hangers. Adjust the positions of the shoes / hangers to clear the wheels and fix to the cross shafts and cross wires with cyanoacrylate adhesive. Form and fix in place the brake pull rods from 0.5mm wire (see diagram on sheet C)..
- 4.39 Temporarily fit the chassis to the body using the two 10BA bolts.
- 4.40 Fix in place the vacuum brake and steam heat pipes, and rear coupling.
- 4.41 Separate the chassis and body, and complete the painting, lining, application of transfers, varnishing, weathering (if required), and addition of coal.
- 4.42 Fit the buffer springs and heads, and re-fit the chassis to the body

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5 Sources of Additional Materials

(please enclose a stamped self-addressed envelope with any initial enquiry)

Alan Gibson (Workshop), The Bungalow, Church Road, Lingwood, Norwich, Norfolk NR13 4TR.

London Road Models, 1 The Avenue, Romford, Essex RM1 4DL.

Eileen's Emporium, PO Box 14753, London SE19 2ZH.

Exactoscale Ltd., 29 Couchmore Avenue, Esher, Surrey KT10 9AS

Squires Model & Craft Tools, The Old Corn Store, Chessels Farm, Hoe Lane, Bognor Regis, West Sussex PO22 8NW.

Branchlines, PO Box 31, Exeter, Devon EX4 6NY.

Phoenix Precision Paints, PO Box 359, Cheltenham, Glos. GL52 3YN.

HMRS Transfers, 9 Park Place, Worksop, Notts. S80 1HL.

6 Reference Works

Locomotives of the Great Western Railway: Part 8 - Modern Passenger Classes, and Part 12 - A Chronological and Statistical Survey, (Railway Correspondence and Travel Society)

The GWR Stars, Castles and Kings, Part 2, by O S Nock, (David & Charles).

A Pictorial Record of Great Western Engines, Volume 2, by J H Russell, (Oxford Publishing Company).

Castles and Kings At Work, by Michael Rutherford, (Ian Allan).

Halls, Granges and Manors At Work, by Michael Rutherford, (Ian Allan).

Castles and Kings, A Pictorial Tribute, (Roundhouse Books).