TODDINGTON STANDARD LOCOMOTIVE LTD

COMPONENT SPONSORSHIP SCHEMES

Lot No: 0074	**Little End Pins (gudgeon pins) – LHS**	Unit Cost: £190	Available units: 4
Lot No: 0075	**Little End Pins (gudgeon pins) – RHS**	Unit Cost: £190	Available units: 4

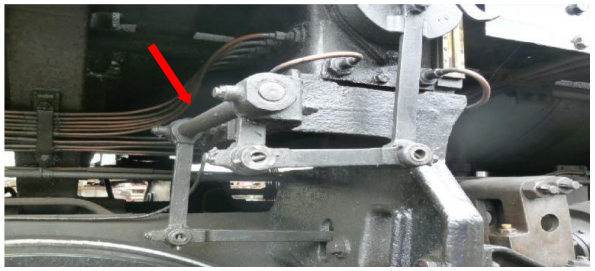
The Little end pins, also known as the 'gudgeon pins', together with the nut and cotter, are the pins that connect the crosshead to the connecting rod. They are located in a prominent position in the centre of the crosshead behind the cylinders.

Little End Pins (gudgeon pins)

Lot No: 0087	**LHS Lubricator drive linkage**	Unit Cost: £200	Available units: 9
Lot No: 0088	**RHS Lubricator drive linkage**	Unit Cost: £200	Available units: 9*

The Linkage that drives both the LHS and RHS mechanical lubricator is connected to the inside pivot point of the expansion link via a bell crank, long connection rod, drive shaft and short connection rod which connects to the bottom of the arm on the lubricator.

Lubricator Drive Linkages



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COMPONENT SPONSORSHIP SCHEMES

Lot No: 0090	**RH Injector water feed connector**	Unit Cost: £375	Available units: 2

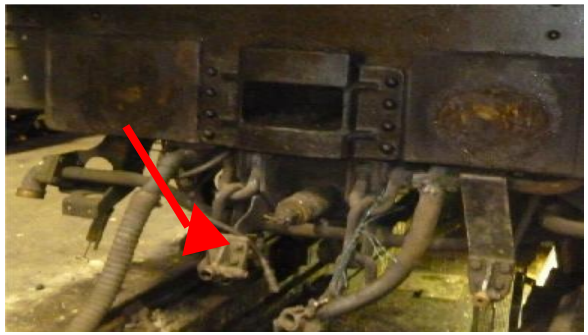
The RH water feed connector is mounted below the cab on the Fireman's side. This component connects the water outlet from the tender to the locomotives live steam injectors.

RH Injector Water Feed Connector

Lot No: 0091	**Tender steam brake connection**	Unit Cost: £200	Available units: 2

The Tender steam brake connection is fitted at the rear of the locomotive under the cab off a bracket attached to the brake shaft.

Tender Steam Brake Connection



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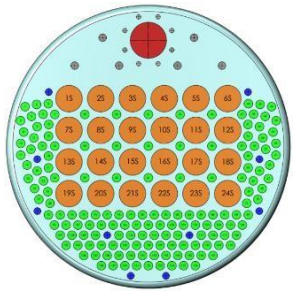
COMPONENT SPONSORSHIP SCHEMES

Boiler

Lot No:	Total number of units - **78**	Unit Cost:
B001	Available units - **56**	£150

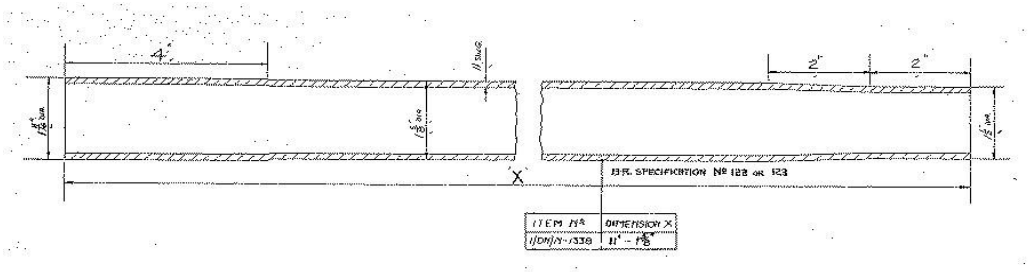


There are 156 smoke tubes fitted in 76077's boiler which are shown in green on the tube plate diagram. This sponsorship is for a pair of tubes and includes the cost of swaging up and down plus the cost of fitting them into the boiler.

A pair of boiler smoke tubes

These tubes are made from solid drawn steel to a required standard for pressure vessels. Each tube is swaged up at the smokebox end and swaged down at the firebox end to fit the tube plates.

The fitting of the tubes involves annealing, polishing, expanding and beading at the firebox end.



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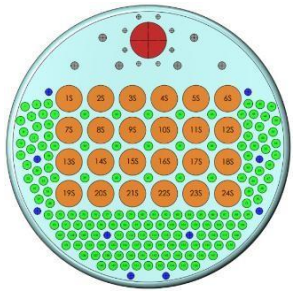
COMPONENT SPONSORSHIP SCHEMES

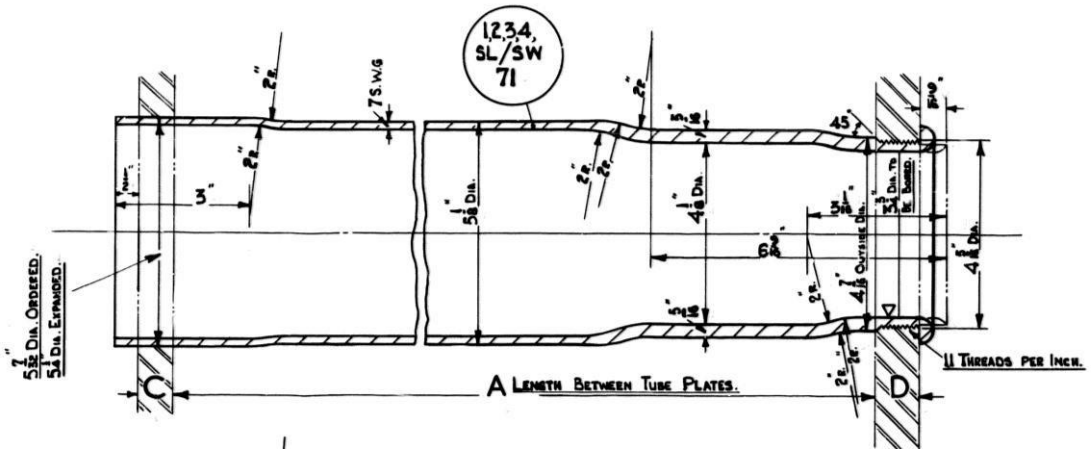
Lot No: B002	Total number of units - 24 Available units - **2**	Unit Cost: £1,000



There are 24 superheater flue tubes fitted in 76077's boiler which are shown in orange on the tube plate diagram above. This sponsorship is for one tube and includes the machining of the bottle ends, welding, x-raying, tapping of the holes in the firebox tube plate and the actual fitting process which involves screwing them into the firebox tube plate, expanding both ends and beading in the firebox.

Superheater Flue Tubes

These tubes are made from solid drawn steel to the required standard for pressure vessels. Each tube has a bottle end welded on to the main tube which is threaded to suit the firebox tube plate. Once welded then the welds must be x-rayed to ensure the weld is good.



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COMPONENT SPONSORSHIP SCHEMES

Lot No: B003	Total number of units - **15** Available units - **7**	Unit Cost: £500

Due to the high cost of this component, the sponsorship has been broken down into 15 units of £500 each. The cost of this sponsorship includes both the manufacture of the tube plate and installation into the boiler and includes fitting approximately 100 rivets to secure it to the boiler barrel.

The smokebox tube plate (shown separated from the boiler in this CAD image), is fitted into the front of the parallel barrel section of the boiler. The smokebox tube plate consists of a flat steel plate with a flange which can be either pressed over a former or fabricated by welding on a steel ring.

A series of holes are accurately marked and drilled to suit the tubes, longitudinal stays, washout plugs and the main steam pipe.

Smokebox Tube Plate

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COMPONENT SPONSORSHIP SCHEMES

Lot No: B006	Total number of units – **20** Available units: **2**	Unit Cost: £120 per pair	**A pair of Copper Boiler Stays**

To join the inner and outer firebox plate work together and stop the metal being deformed by the pressure within the boiler, stays are used. There is one of these stays fitted to approximately every 4 square inches of unsupported flat plate work. BR standard locomotives were built with predominantly Monel metal stays but copper was also used in areas more prone to flexing.

This sponsorship is for a pair of copper stays and includes both the manufacture of the stays and installation into the boiler including re-tapping the hole and tooling over the stay head to effect a good seal.

Copper is used for its flexibility and corrosion resistance, but the correct grade is difficult to source which makes it expensive to buy.

To ensure a good seal each stay has to be accurately machined from round bar to the correct thread diameter (within 0.001") for the hole it's destined for. The thread at each end of the stay must also be in pitch so as to enable it to screw into position.

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COMPONENT SPONSORSHIP SCHEMES

Lot No: B009	Total number of units – **100** Available units - **100**	Unit Cost: £120 (5 stays)	**Five steel boiler stays**

This sponsorship is for a quantity of 5 steel boiler stays. The cost includes both the manufacture of the stays and installation into the boiler including re-tapping the hole and caulking to ensure it seals effectively and a sacrificial nut fitting on the fire side, to protect the end of the stay from damage due to the heat of the fire.

To join the inner and outer firebox plate work together and stop the metal being deformed by the pressure within the boiler, stays are used. There is one of these stays fitted on approximately every 4 square inches of unsupported flat plate work.

With the additional work to renew the bottom section of the outer firebox now required on our boiler we need 500 of these stays to tie the inner and outer firebox together. To ensure a good seal each stay has to be accurately machined from round bar to the correct thread diameter (within 0.001") for the hole it's destined for. The thread at each end of the stay must also be in pitch so as to enable it to screw into position. A nut is also fitted to the end of each stay inside of the firebox. This protects the end of the stay and prevents damage from the fire.

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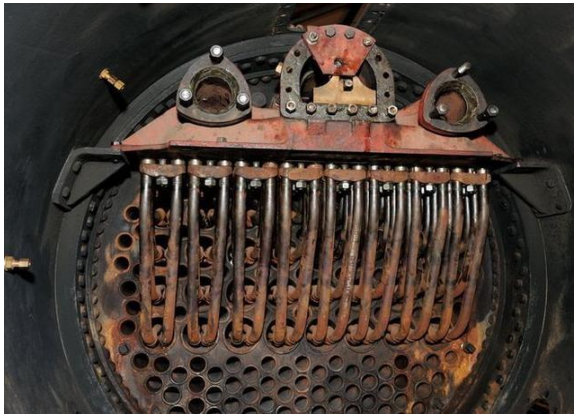
COMPONENT SPONSORSHIP SCHEMES

Lot No: B010	Total number of units – **24** Available units - **24**	Unit Cost: £1125 each	**Super heater element**

There are 24 superheater flue tubes fitted in 76077's boiler and each one of these needs a super heater element fitting.

The purpose of a super heater element is to collect steam from the header (regulator) and pass it down the flue tubes several times so the heat from the fire can dry the steam further. This gives the steam better expansive properties and as such when running makes the locomotive more efficient.



Whilst we do have the original elements removed from our boiler soon after its arrival from Barry scrap yard in the 1980's they are unlikely to be fit for a long service life. It would be preferable to fit new elements during the restoration, rather than patching up the originals.

Unfortunately due to the design, and unless it's one of the bottom row that is leaking, all the others need to be removed to gain access to the defective one, meaning repairs are very labour intensive.

Fitting new at the start of the boiler certificate should ensure they last for the next 10 years or more, ensuring the locomotive remains reliable and keeps earning money for future overhauls.

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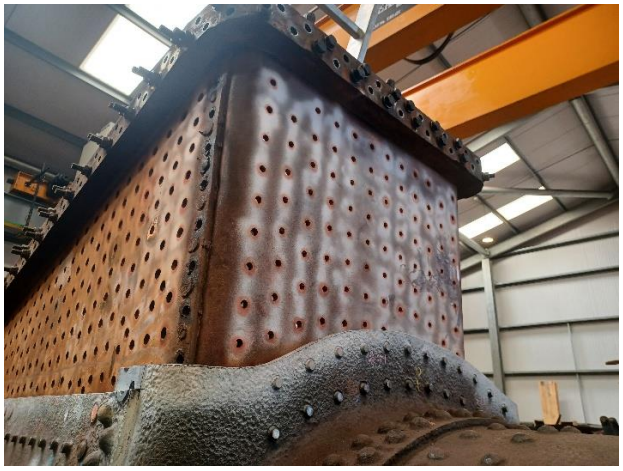
COMPONENT SPONSORSHIP SCHEMES

Lot No: B011	Total number of units – **42** Available units - **42**	Unit Cost: £425 each	**1 sq ft of copper firebox plate**

As the boiler overhaul has progressed it has become clear that the previous repairs carried out by British Rail in the 1960's were not as good as we were expecting. When the stays (fitted in 1964) were removed from the sides of the firebox it was discovered that the stay size was approaching the maximum allowable and that cracks were present which radiated out from the stay holes. The cost of welding up and redrilling all these holes is very similar to the cost of replacing the copper plate, so the decision has been made to replace the copper in the lower part of the firebox with new material.



Replacing the platework also allows small first size steel stays to be fitted giving the firebox a much greater life expectancy as it allows new larger stays to be fitted in the future as and when repairs are required.

Copper for a steam locomotive firebox is a special alloy known as C107 it contains small amounts of Phosphorus and Arsenic to help with the extreme temperatures and the flexibility required when the locomotive is in service. Unfortunately, it is now very difficult to source and so demands a premium price. The total amount of copper to be replaced is 42 square feet.

This sponsorship is for 1 square ft (300mm) of 5/8" thick (16mm) it includes fitting to the boiler. Help us to complete 76077's boiler overhaul and return the locomotive to service as soon as possible.

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COMPONENT SPONSORSHIP SCHEMES

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