

A Little Pinch of Salt

by Roger Stephen

I have been making a steam raising blower for the club loco 'Polly'. Part of it consists of a brass plate with a short piece of tube silver soldered to it. In use, the tube goes in the top of the loco chimney to hold the blower in place. Like most model engineers my first port of call in finding a suitable piece of tube was my scrap box. There I found a bit of what looked like thin wall brass tube, 28mm outside diameter and 28mm long – a perfect easy fit in Polly's chimney. It had originated in my late father-in-law's workshop and was a bearing bush from a hardened steel shaft.

So, I cleaned up the tube and brass plate ready for soldering, fluxed the joint with Easy-Flo flux and applied my blow torch to silver solder it with Easy-Flo No2. Problem was, for some reason the solder did not flow nicely round the joint like it should do. After dropping it in the pickling solution and cleaning it up it was apparent that the solder had only taken in one place and most of the joint was not soldered at all. Try again I thought so I cleaned it up, re-fluxed, heated it up – and the solder still didn't run as normal but it did at least take in three or four places and the tube appeared to be firmly fixed.

I don't normally have any trouble with silver soldering brass and this failure was bugging me so I started doing a bit of research. I also noticed the bit of tube was surprisingly hard for brass when touched with a file. The answer came from the excellent CUP Alloys website. They are a supplier of solder, fluxes and associated stuff to model engineers and a paragraph in their Best Brazing Practice page entitled 'Help Me Choose' caught my eye. It was about soldering 'Aluminium Bronze' and said that "conventional fluxes will not remove the aluminium oxide if the aluminium content is above 2%". It sounded like I might be on to something here but what is aluminium bronze and what is it used for?

It turns out aluminium bronze is an alloy of copper and aluminium (unlike brass which is copper and zinc, or ordinary bronze which is copper and tin). Among its uses is bearing bushes due to its harder wearing properties on hardened steel shafts! The CUP Alloys paragraph continued saying "Increase the activity of Easy-Flo flux by adding 25% by weight of kitchen salt (sodium chloride) to the flux. Treat normally using 455". Note that 455 is the modern cadmium free equivalent of Easy-Flow No2 solder.

So I gave it a go, mixing (very roughly) three parts EF flux with one part table salt and applying that to the joint. Result: miraculous! As soon as the metal reached dull red heat the solder ran round the joint just like it should with a lovely even fillet all round.

So there you have it. Problem solved thanks, literally, to a pinch of salt!



Here is the finished item after re-heating with salty flux! There is now a nice neat fillet of solder all round the base of the tube.