TSME Hints - June 2019

2019-06-01

Silver Soldering Hints and Tips

Not sure what silver solder to use, and it is steel, brass or copper? Start with Johnson Matthey SILVER-FLO 40 or 55. Note that standard silver solders are defined in ISO Standard 17672. Silver-Flo 40 will be the cheaper product. For higher temperature and gap filling capabilities consider SILVER-FLO 302 which has gap-filling capabilities and creates bigger fillets. Note that these SILVER-FLO solders are all Cadmium free whereas the previous EasyFlo product line contained Cadmium.

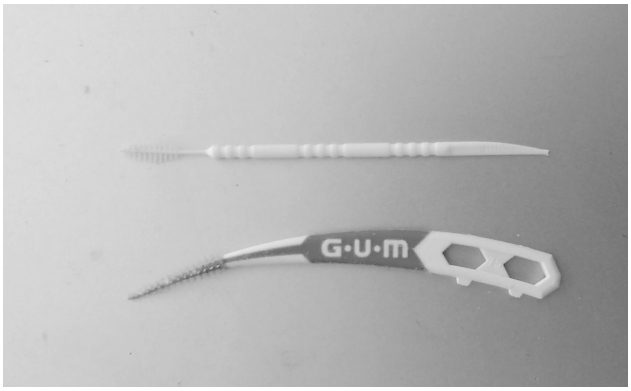
SILVER-FLO 40 () melts at 650C - 710C, whereas SILVER-FLO 55 melts at 630C - 660C, and SILVER-FLO 302 melts at 665 - 755C. The lowest percentage silver content useful for hobby purposes will have a a melting point below 800 C. One product of this type is Johnson Matthey, SILVER-FLO 252, or equivalent, which has a Melting Point of 800C and is 25 percent silver. The lower the silver content in general, the lower the cost; but these lower content solders need higher temperatures and generally are more difficult to use.

Technique

1. Prepare your pickle bath. The best pickle product for amateurs is citric acid, made up to 10% solution. Citric acid is available as crystals, from any beer or wine making store. Add to the pickle one drop (max 5ml) of washing up liquid, which will act as a wetting agent. One trick to improve pickle performance is to put your pickle in a slow cooker pot (Crock-pot), and warm the pickle. Most documents suggest using 10% Sulphuric Acid, but this acid is dangerous to mix and more difficult to clean up, why use a dangerous acid when a simpler solution exists? Always use a pickle bath, with a lid and a safe storage place.
2. Always clean and flux the silver solder rod as well as the pieces to be joined. Clean means oxide free, bright, oil and grease free, and finger print free (your hands always carry natural oils), and once a joint component is clean, flux it immediately, and move on to cleaning the next part.
3. Solder flows where there is flux, no flux applied, therefore no solder. Be careful where you apply flux, wipe away flux that could lead to parts having unnecessary solder on them. Apply a coat of solder anti-run if it is critical the no solder flows in a particular area. The common anti-run agents are soft pencil lead (2B to 6B), Never Seez - Lubricating Compound by Bostik, white office correction fluid, marking out ink.
4. Always secure the parts, heating and the changes in the flux during heating can easily move parts. Secure with slots, small screws, threaded components, black iron binding wire (available to very fine diameters from Jewellery Supply Houses), clamps, temporary nippers, or weights.
5. Cut a piece of solder and apply it to the joint where you want the solder to run. For example, a 1/4” diameter joint, 1/4” deep, and with a 0.003” gap between the components, requires a piece of 1/16” diameter solder, 3/16” long, to completely fill the gap.

6. George Thomas states in one of his books, cut little pieces of solder, and store them in a jar with a lid until required, then pick out a piece or two that meets your needs. To cut up solder you need a sharp pair of diagonal cutters, and a large plastic bag. Put the rod and the cutters and your hands inside the bag, make sure the neck is sealed and cut way. The bits fly everywhere but are collected inside the bag.
7. Be warned - using a stick or rod of solder inevitably applies a lot more solder than necessary, which leads to a messier joint and higher cost!
8. Apply heat, if possible, to rear of joint, opposite side where your piece of solder is, or where you intend to apply solder from a solder rod, if you must use that form of application. If that is not possible apply heat from the solder side but make sure you spread the heat by moving the torch around. Remove the torch from the work if you are using a stick of solder on the joint, if the part to be soldered is hot enough it will transfer enough heat to melt the solder.
9. When the correct amount of heat has been applied, the solder will melt and flow. If the solder sits in a ball and does not flow, solve by using a simple pointed piece of wire, apply a little flux, and perhaps prod the ball, as it may be held together by surface tension.
10. When the solder has run, remove heat immediately and allow to cool. Do not place immediately in a pickle bath!
11. When the piece has cooled down to a low temperature, carefully place in the pickle for a long period,(at least 15 to 60 minutes in a pickle bath).
12. Clean up with a good wash in warm water and if necessary use a brass brush to remove loose flux.

Accurate Fluxing In Small Areas



(a) Fluxing Using Soft Dental Picks

(b) Dental Picks - Product Packaging