Troubleshooting at the Jeweler's Bench: Soldering Issues

SOLDERING

PROBLEM	DESCRIPTION	CAUSES	FIX BY
JOINT HASN'T SOLDERED **Applies to:** All metals	Piece has not soldered at all.	The torch flame can cause a draft that blows the pallions of solder away. It can be hard to spot this when the flux bubbles up.	Pickle, rinse and re-solder, paying close attention when you introduce the torch to the piece.
	Pallions are still visible on the piece.	Not enough heat has been applied to allow the solder to run.	Pickle, rinse, reflux and try again. Warm up the whole area around the joint quickly by using a large bushy flame.
		The heat was insufficient but left on the piece so long that the flux has burned away.	
	Solder has balled up rather than running along the joint.	Too much heat was applied to the joint rather than the whole piece, or sufficient heat did not reach the joint.	Remove the balls of solder, pickle and rinse the piece, reflux and solder again.
		Flux has become exhausted or insufficient flux was applied.	
		Dirt or grease has prevented the solder from running.	
SOLDER HAS RUN BUT JOINT UNSUCCESSFUL **Applies to:** All metals	There is a gap in the seam after soldering.	The joint does not fit together perfectly — solder won't bridge a gap.	Saw open the section that has joined. Run a saw blade through the gap until the joint is light-tight. The blade acts as a tiny file, taking a small piece off each side of the joint.
		The piece or your hands are not thoroughly clean — solder will not flow over contaminants.	Make sure that the piece and your hands are scrupulously clean and free from grease.
	Solder has melted but remains on one side of joint, rather than bridging it.	The heat was concentrated on one side of the joint.	Pickle, rinse, reflux and apply heat more on the opposite side. Try to use the heat of the torch to pull the solder around to where you need it.
		Edges of the joint are not a perfect fit.	Run a saw blade down through the gap, repeating several times as necessary to get a good, tight fit.
	Joint has broken. This sometimes happens once you put a ring on the mandrel to true it up.	This might be due to not enough solder or too widely spread flux.	Run a sheet of emery down the joint to remove contaminants, then scrub with liquid detergent. Use a fine paintbrush to apply flux precisely where it is needed, then re-solder, using binding wire to hold the edges of the joint together if necessary. When soldering a ring, start the heat at the opposite end from the solder seam. This will cause the metal to expand slightly, pushing the joint closer together.
		Overheating can cause the solder to be absorbed into the metal.	
		Contaminants on the seam.	
METAL HAS MOVED WHILE BEING SOLDERED **Applies to:** All metals	Pieces being joined no longer meet as they should.	Metal can stretch and move slightly when heated, resulting in its position changing during the soldering process.	Use heat to separate the elements that have joined badly, pickle and clean them, then re-solder. Any tension in the metal should have been removed by heating.
			For future projects, try annealing elements before setting them up for soldering. This should get any movement out of the way in advance.
BUBBLES AND PITS ON JOINT **Applies to:** All metals	Seam is visible because of bubbling.	In its liquid state solder can react with atmospheric gases, which can become trapped as tiny bubbles when the solder solidifies. This can happen if the metal or the solder is dirty, or if too much heat has been applied. It can also be the result of repeated solderings that have caused the alloys to decompose slightly. It is most obvious when an excessive amount of solder has been used.	Pickle and rinse the piece, then file off excess solder. Reflux, bind with binding wire if necessary and heat until the solder flows again. You may need to add some more solder.
CHAIN LINKS SOLDERED TOGETHER **Applies to:** All metals	Chain becomes stiff and does not hang properly.	Solder has run onto the wrong part of the chain, fusing two links together.	Hold one of the fused links in tweezers in a third hand. Play a flame over both fused links and use another pair of tweezers to gently wiggle them apart. Keep moving the link after removing the flame until you are sure it will not re-solder.
JUMP RINGS FALL OFF **Applies to:** All metals	Although solder has run, jump rings are not strongly attached.	There is not enough metal making contact for a stable joint.	File a flat area where the jump ring attaches to the main piece. This creates a more stable contact area and will not be noticeable once the piece is finished.
		The jump ring did not get hot enough because the reverse-action tweezers acted as a heat sink.	Use fine stainless steel tweezers to hold the jump ring — these will allow more heat to reach it.
EAR POSTS OR PIN BACKS MELT **Applies to:** All metals	Posts and pins melt in the heat.	When attaching small or thin pieces of metal to a larger piece, the latter will require much more heat to get up to temperature than the tiny pieces.	Heat the melted post until the solder runs, then pick it off. Pickle and rinse. When re-soldering, watch the solder very carefully and remove the heat as soon as it runs.
			Note that there is usually no need to heat ear posts or other small pieces when soldering them onto something large because they will pick up sufficient heat from the main piece and the hearth.

Source: Troubleshooting for Jewelers