



## **Jewelry Fact #1**

*A melted piece of jewelry can be thrown farther across the room than a successfully soldered piece..... It might have to do with the way the air flows through the melted area, creating “lift” like an airplane wing, but I think it is due to the frustration level of the thrower. This article is my attempt to make this “fact” an irrelevant folklore, to lower your soldering frustration, and make you and your torch the hero of your jewelry making story.*

*In the many years I have been making and teaching jewelry, I have seen many failed attempts at soldering jewelry, and most of them can be traced back to a lack of attention to the 5 key elements of soldering in the following article. I promise if you follow these rules every time, you will have more success, and hopefully the only flying jewelry you will see is your jewelry creations “flying” out the door in more sales.*

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## **1. Joint Preparation**

It is very important to pay attention to the “contact point” or the soldering joint you are attempting to solder. Spend EXTRA time making sure the 2 ends to be joined are as flush as possible. When I say “flush” I mean the 2 ends need to be as closely matched up as you can get them. Use your magnifying visors or an eye loupe to ensure they are evenly matched and flush.

### **Here is what to avoid:**

In Figure 1 and 2 below, the 2 ends to be soldered do not match well and have gaps which will take more solder to fill in the area. Solder “will” fill in gapped areas, but it will be a weak union, filled with pits, and when you go to finish the piece, it will have a darker color and have pits that will be unattractive. This solder joint will likely break easily if it is on a high use area, or a stone setting.

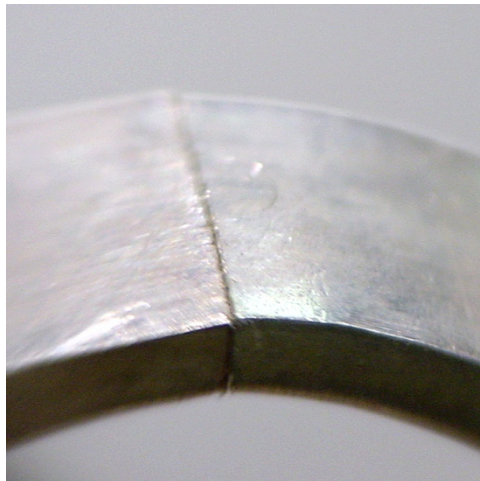
\* With a little more time spent preparing the solder joint, these defects can easily be avoided, and you will have a much higher chance of soldering successfully.

**Figure 1 and Figure 2 (AVOIDANCE)**



Spend extra time lining up and filing (sanding) the 2 ends so they match well, the image below (Figure 3) is what you are aiming for, a nice match, so very little solder is needed to join these 2 ends, and clean-up is quick and will appear seamless. I use a #6 (escapement) Equaling File or a Snap-on Sanding Disk to get these 2 ends to match. There is a YouTube Video explaining this HERE → <https://www.youtube.com/watch?v=A0qCNljaS8w&t> .....or follow <http://youtube.com/dougnapierjewelrymonk>

**Figure 3 (Good Match)**



**Here is also what to avoid:**

In Figure 4 and 5 below, the 2 ends to be soldered do not match well and will require more filing and sanding to get them to match. This will result in a thin, weak solder joint and might show up as a hole in the piece, or a weak area which will eventually break or wear through prematurely. In a joint like this, you will need more solder to fill the 2 ends which might cause a “solder bump” in your piece which will also have a darker color and pits that will be unattractive. This area will also be hard to work with if it is on a bezel, because solder is a harder metal to bend and form, and if you are setting a stone in a bezel, there will be a spot that is not uniform and will be unattractive.

\* With a little more time spent preparing the solder joint, these defects can easily be avoided, and you will have a much higher chance of soldering successfully.

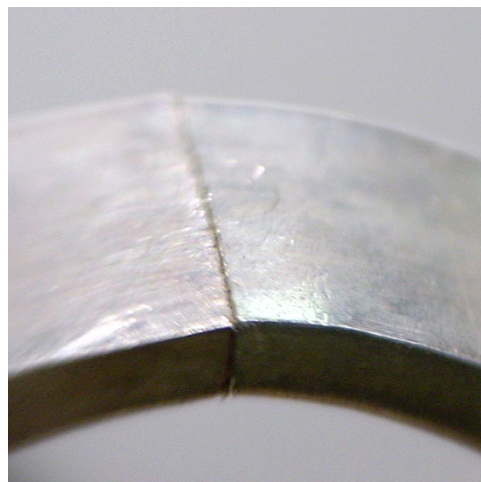


**Figure 4 and Figure 5 (AVOIDANCE)**



Spend extra time lining up and filing (sanding) the 2 ends so they match well, the image below (Figure 6 and 7) is what you are aiming for, a nice match, so very little solder is needed to join these 2 ends, and clean-up is quick and will appear seamless.

**Figure 6 and Figure 7 (Good Match)**



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## ***Jewelry Fact #2***

*If you are going to run out of fuel or oxygen for your torch, it will happen during a time when you are pressed for time to get an order out, most likely on a weekend when refilling the tanks is not an option until Tuesday, since Monday seems to be some sort of a holiday. Just plan on this happening, so always have a backup tank available for these moments.*

## 2. Cleanliness

It is very important to pay attention to the cleanliness of the “contact point” or the soldering joint you are attempting to solder. Sometimes it is the little details like this that will make or break a soldering project. We don’t think about it, but the dust on our bench, polishing compounds, debris from files and sanding tools, cat/dog hair, even the oils from our fingers can get into a soldering joint and interfere with a successful soldering operation.

I have a small ultrasonic cleaner close to my bench that I use many times before I solder. I also have a steam cleaning machine that I will use to clean the joint before soldering. I understand many people do not have these pieces of equipment in their shop, or the corner of their space where they make jewelry. I also have a soft toothbrush on my bench that I use to clean debris from my pieces, and I will also use soapy water (Dawn or Simple Green) to clean my pieces before soldering. Again, it is these little actions that are sometimes the deciding factor of a successful solder job, or a defect. These are good habits to get into before each project and will definitely make a difference in your overall progress as a jeweler. See Figure 8 and Figure 9 for the difference.

**Figure 8 and Figure 9**



If you look closely at the first image on the left, there is sanding dust and oils in the contact point getting ready to be soldered. This will interfere with the solder and create an incomplete solder joint, or at minimum pits in the soldering area that will show up when you are polishing the final piece. Unless you are looking for this under magnification, you won’t see it, but you better believe it is there, and will cause frustration later. Cleaning your piece before soldering is a good habit to get into and will definitely make a difference in your overall progress as a jeweler.

\* With a little more time spent cleaning the area before soldering, defects can easily be avoided, and you will have a much higher chance of soldering successfully.

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### ***Jewelry Fact #3***

*When working with small objects, they WILL fall on the floor, take an awkward bounce and land at the point that is the hardest to reach, behind or under something heavy and you will spend plenty of extra time fishing it out with a piece of wire or broom..... that is if you are lucky. It is more probable that either it will never be found, or 6 months later, right in front of you after you drop something else.*

### **3. Flux**

It is important to use a good flux, and to make sure the entirety of the area to be soldered is covered with flux. There are many fluxes on the market to use, but for years I have used Handy Flux, which is a flux used in low temperature brazing. It is a white, water-based paste, that when heated, glazes over and covers the solder joint. I keep it covered in an old baby food jar, and if (when) it dries out, I can always add more water and it returns to its creamy consistency, good as new. **ALWAYS USE IN A WELL-VENTILATED AREA**

Flux does 2 very important things during your soldering operation. First, it acts as a “solder lubricant” which helps the solder completely flow through, and join the area being soldered, making a seamless and strong solder joint. Without a good flux, during the soldering process, while heating the solder, it will ball up on top of the solder joint, and the solder will boil and burn away some of the important alloys that make it a solder. When this happens your luck just ran out and there is very little chance of getting a strong, clean soldered area. It will either not flow at all, or the solder will have a lot of pits and be almost sponge-like.

The second important thing flux does is to protect the area being soldered from oxygen. Precious metals, especially silver, does not like oxygen present during the soldering process, and while most torches use oxygen to create a hotter flame, it is critical to protect the area from added oxygen during soldering. Again, without a good flux, during the soldering process to protect the area from oxygen, the soldered area will have pits, or worse yet, have incomplete soldered areas which will be brittle and break easily.

Below in Figure 10, is an example of the fluxed solder joint ready to be soldered, and in Figure 11 is the jar of flux I use. I have a thin stainless-steel wire I use as an applicator, so I can add flux to the area thoroughly, and in hard-to-get areas:

**Figure 10 and Figure 11**





Another benefit of using paste flux is while soldering, I use a soldering pick, and I can add just a little flux to the very tip of my pick, and pick-up and place the solder chip in the exact place I need it to go. I just dip the pick into the flux jar, and touch the prepared solder chip, and it picks it up like magic: (See Figure 12 and 13)

**Figure 12 and Figure 13**



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### ***Jewelry Fact #4***

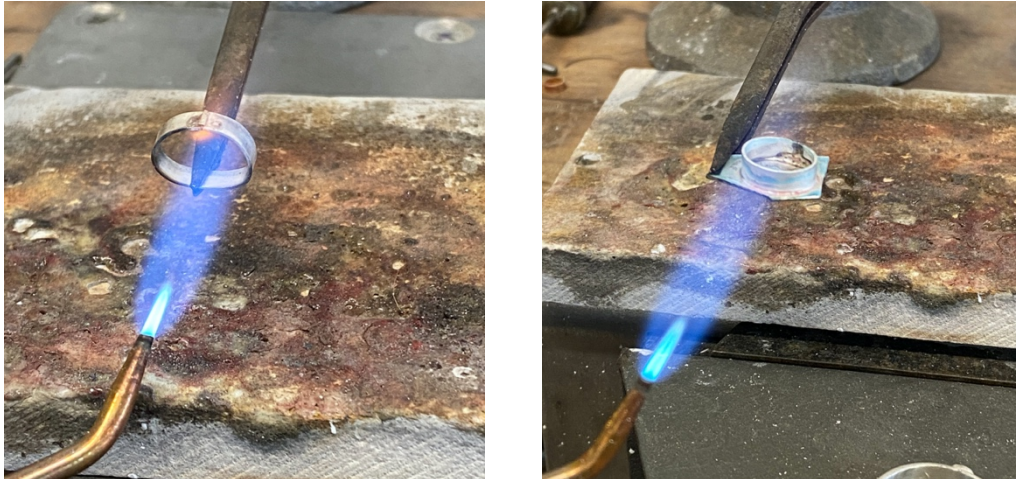
*The tool you are looking for is in a pile right in front of you, you can't see it right now, but in 5 minutes you will find it in plain sight, then you will take a moment and question your sanity. It is OK, you are sane, it happens to all of us.*

## **4. Position of Your Work**

Another important aspect of a successful soldering experience is what I call the position of the work. I have used what is called a "Third Hand" for many years, and about 98% of my soldering operations are done by holding the piece being soldered in my third hand. A principle to remember about soldering is that **Solder Follows Heat!** Repeat that over and over, Solder Follows Heat, Solder Follows Heat, Solde.....ok you get it, and how important this is to remember.

When a piece to be soldered is sitting on a soldering pad, or a charcoal block, that material is acting as a heat restrictor, or a heat sink. This requires you to heat the whole piece up very hot to get the solder to flow, and the solder is going to flow along the path of least resistance, usually onto the thinnest area of the piece, the bezel, the wires, or wherever you don't want the solder to flow. With the jewelry being held in a third hand, it is elevated, therefore allowing me to control where the heat is applied to the piece, and therefore where the solder is going to flow. See below in Figure 14 and Figure 15 how the piece being elevated off the soldering board allows me to control the heat, therefore allowing me to control where the solder wants to flow.

Figure 14 and Figure 15



Being in control of the position of the piece to be soldered allows you so much more control of your flame, your heat, and the direction of the solder flow, and mastering this concept will allow you to be so much more confident in your abilities as a jewelry maker. Soldering will be something you understand, instead of something that works sometimes, and fails other times, with no rhyme or reason..... There are scientific principles involved, not holding your breath and hoping the soldering gods are in a kind mood, I promise.

\* With a more time spent adjusting the position of your work during solder, defects can easily be avoided, and you will have a much higher chance of soldering successfully.

### ***Jewelry Fact #5***

*The final jewelry fact has to do with “time warp” and is really unexplainable. When you go to your workspace to work on a project for a few minutes, hours will pass by, your coffee will get very cold, hunger will be something long forgotten, everyone will have gone to bed, and you will sit and wonder how this happened again. It is OK, that is a side effect of enjoying what you are doing.*

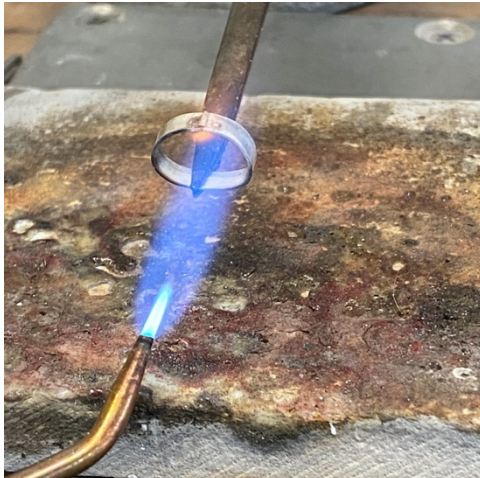
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## **5. Heat Control**

The Final Tip in successful soldering is Heat Control. I mentioned this earlier, and cannot stress its importance in soldering enough, **Solder Follows Heat!** Once you start to see the importance of the position of your work, you will be able to make the solder do exactly what you want it to do with your torch. **UNDERSTAND THIS:** the torch is not what melts the solder, it is actually the heat that the torch generates. Understanding this will help you be better at soldering. In the following images (figure 16 and figure 17) I want you to see how all 5 principles work together. First you have a **Joint** that is prepared correctly with filing and/or sanding so the ends are flush. Next you **Clean** and **Flux** the solder joint to get ready to solder. **Elevate** the bezel with your

third hand and apply the solder to the Top Side of the solder joint, making sure the solder is touching both sides of the solder joint. Carefully apply the **Heat**, from the torch, to the bezel, from underside of the solder joint, which will melt the solder and DRAW the solder all the way through the solder joint, from top to bottom. This will make a strong solder joint and assure you the solder is completely through the area. In Figure 17, you can see the solder on the inside of the bezel, because the heat has pulled the solder from the top side through, to the bottom.

**Figure 16 and Figure 17**



Here, after I am sure the soldered bezel is a complete secure solder, I check to make sure the solder did actually flow all the way through the soldered area, then I round the bezel and make sure it fits the stone. Then I file the bottom area that will be soldered to the base, making sure it is even and flush. I use the reflection of my light source to be sure the filed area is flat and flush to the backplate. You can see in "Figure 18" how the file has prepared the edge even. I once again, clean and flux the area. I add 3 to 4 small pieces of solder to the inside of the bezel, elevate the piece to be soldered and apply heat from underneath, heating the bezel base and using the heat to melt the solder, not the flame. I am using medium silver solder to do all the soldering on this piece, and if you notice, the original solder joint on the bezel is towards the back. I will get the solder to flow on the front side first, which will hold the bezel together secure, so the original solder joint will not open up. Once the solder starts to flow along the front of the solder joint, I move the heat around the sides and towards the back of the solder joint, doing all this with the heat from the torch on the underside of the piece. I do not move my torch and add the flame to the top of the bezel, The Heat is doing the work. (See Figure 19 and Figure 20)



Figure 18

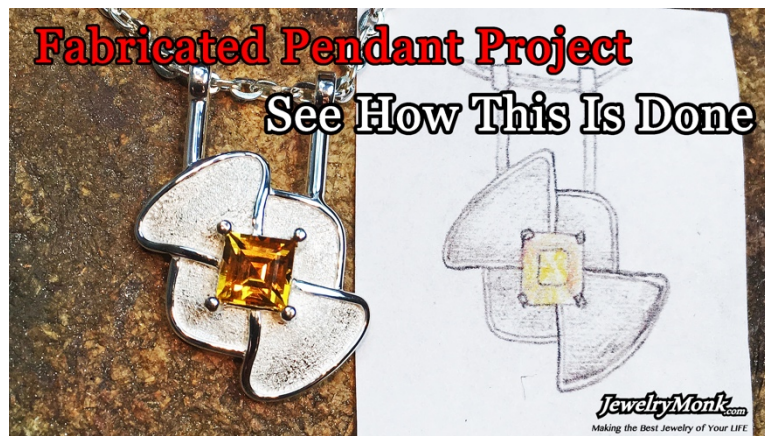


Figure 19 and Figure 20



*\*NOTE – There are many tools available, torches, fuels, holders, fluxes, solders, etc. and I encourage you to try them and experiment always..... but these methods I am explaining have worked for me for years and are a great foundation on your jewelry making journey.*

DO YOU WANT MORE?



## Soldering Video Series

\*If you want to dive deeper into soldering and fabrication, I do have created a 15 Lesson, Step by Step Video Series (+ bonuses) called **"The Fabricated Pendant Project"** that covers every aspect of creating an award-winning pendant from the drawing, all the way to polishing. This piece is all fabricated and soldered in sterling silver with sheet and wire. Since you have showed interest in soldering, I will give you a **25% DISCOUNT CODE** to the course.

Use the Code: **5TIPS** at checkout.

Here is the link: <http://jewelrymonk-llc.thinkific.com/courses/fabricated-pendant-project>

Don't forget to Use the Code: **5TIPS** at checkout.

Thanks for being part of the JewelryMonk Community, I hope you found this information useful!

Now, Go Make Something Beautiful.

Doug