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Do you have contamination problems in your metals?

One of the most frustrating problems working with sterling and De-Ox sterling silvers is hard spots and or micro inclusions in cast pieces of jewelry. So how do we find the root of these problems?

In today's market place of metals there is a vast amount of alloys and fine silver suppliers the world around all offering or claiming to be the best in the market. Be very careful with choosing sources for your fine silver. Many times from localities around the world I have had samples of fine silver assayed and had reports return with small to large amount of contaminates. These include iron, nickel, antimony, lead, arsenic, cobalt, and more. All of which will "and I stress", not may, but will cause hard spots and porosity! These results have come from improper refining of raw material and or of the reclaiming of used metals. So be careful! Most of them were from suppliers claiming .9999. But don't be fooled, do your research and ask for assays and quality control guide lines and if possible ask for reference of clients that support their product.

Now with this done and you have assured yourself that you have started with qualified materials of .9999 pure in fine silver, and have found an alloy that has been proven to be one of the best in the market you are ready to product really great quality jewelry, or are you?

It is easy to say that you have obtained the best materials and that should cure those problem hard spots and porosity inclusions, but in reality this is just the beginning.

Briefly let's talk about your waxes. Ideally silicone rubber injection molds are the best if you do not use metal molds, but many people use the good old standard rubber, in which they most commonly use talc to help release the waxes. Now if you do, you have just introduced a contaminate into the process! Yes the talc does lead to a rough surface which will not be removed completely with the lost was.

Now, let's talk about investment. Find a good investment. There are many on the market and the old saying is true, you pay for what you get. If you buy a better quality you have less chance or break down of the investment which can sluff off and flow into the metal as well. Needless to say that proper mix and burnout time must be correct.

One other problem I have seen is lack of use of still or D.I. water to the investment mix. Well or tap water many times is full of minerals including ferrous iron, which will react with investments to cause break-down. The contaminants will rise to the surface of the casting and be gathered with the metal as it fills and reacts to cause micro porosity on the casting.

Okay, so now we are going to blend our alloy with fine silver. Weather this is done in a machine or by hand torch, cleanliness cannot be stressed enough! Is the crucible clean? Either stat with new or very clean crucible. Now do the melt making sure it is brought to proper temperature and mixed thoroughly, then proceed with graining. This should be done with an adequate cover gas as well to inhibit oxides from forming. I have found that it is better to pre-grain before cast, do not try and blend and cast all at once because more often than not the fine silver will have trapped oxygen in it and can cause oxides to form in the casting (I.E. porosity!).

Now did you grain into filtered chilled water? If not you may have just added more contaminates from the water. Also the addition of methyl alcohol in small amounts into the water will help to keep the grain cleaner when poured.

Also something to keep in mind if you are using graphite crucibles, make sure that there is adequate cover gas. Heat and oxygen break down graphite which can sluff into the melt. So be sure that the machine you are using is in proper maintained condition and that seals do not leak and use proper cover gas, this is a must!

So now we have done everything we can to produce a contamination free casting, and have great results. It is not time to reuse the trees left over from the previous castings. Most companies that supply you with alloy or karat grain will tell you to reuse the trees left over from the previous castings. Most companies that supply you with alloy or karat grain will tell you it is okay to use 50/50 or 60/40 of new and old to blend and recast. In most cases this is alright to do, but first you have to be sure that what you do reuse is properly prepared. One very important thing to remember is that the button will always contain the most amounts of oxides or contamination and I highly recommend these be sent out for refining. The left over trees can be reused, that there are some very strict guidelines to be followed first. Do a high pressure clean and ultrasonic dip and then rinse in D.I. water. Next re-grain them before mixing with new metal. The trees themselves will trap and hold oxides.

Now something that I should talk about is tumble cleaning and rinsing your new blended grain and re-grained trees prior to use. Even though you have followed all the guidelines for the making of your grain there can still be contaminations on the surface of the grain. Tumbling of the grain in a rotary tumbler for ½ to 2 ½ hours with a ph balance soap will remove any oxide left on the surface. I recommend AMI's Magic Tumbling powder. The powder is properly ph balanced and leaves no residue behind like some liquid tumbling soaps. After tumbling, rinse in hot clean filtered or D.I. water, and then dry before use in the melt.

So before you jump to conclusions as to the sources of your casting quality issues, make sure you evaluate all the potential sources of contamination in your process. AMI provides technical support to help our customers solve these problems and achieve superior casting results.

Charles Bennett
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