



MSG Jewellers

Gem Talk

by Michael S. George

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Designing & Manufacturing Custom Jewellery

In this issue of GemTalk, let's discuss custom designing and manufacturing of jewelry. Many clients who come through our doors ask us if we do custom work, having no idea what it entails to design a piece of jewelry or custom manufacture. They are usually intrigued when they hear about the process. So let's discuss it a bit today.

There are multiple ways to custom manufacture a jewelry item. A goldsmith may prefer to manufacture a piece using the actual metals. By manipulating its shape, dimension, and thickness they can take ordinary gold wire or gold sheets (gold is very malleable) and manufacture a wonderfully beautiful creation. That is a process that takes a lot of skill and you must be a craftsman or an artisan to be able to do this. With some vision, it can really take shape. It is probably the oldest way of custom creating and it goes back even to the biblical days. When you look at Moses and the building of the Tabernacle in the wilderness, you can see that they would make items out of pure gold. The large items had to be made out of one large, solid piece of gold and be manipulated by their artisans.

Gold becomes less malleable once it is alloyed; this is because alloys are other metals added to the gold to make it harder or stronger. The higher the karat of gold, the more malleable it is. You can take a very small piece of pure gold and hammer it out to become a very thin, large sheet. This sheet can then be manipulated into the form that the artisan desires to make.

But the most common type of custom manufacturing work that is being done today is called the Lost Wax Investment or the Lost Wax Casting. This is where a prototype of the jewelry item that will be manufactured is first carved from a piece of wax; this could be a pendant, a ring, a bracelet, or even earrings. An exact duplicate of this item will first be carved from a piece of wax to scale. This takes the hands of an artist or artisan also; this is so that every detail will be finely matched in this wax prototype. This prototype will be put into a base called a sprue. It has a steel sleeve or collar put over it creating a three-sided cylinder with an opening at the top. The cylinder is then filled with a special plaster-like product called Satin Cast and is allowed to solidify.

Now the sprue that the wax was placed on has a hole that when it is removed, because it is made of rubber, we will have the steel cylinder, the wax prototype inside that hardened plaster, and the hole at the base. This hole allows the wax to dissipate out when it is placed into an oven. Depending upon the size of this cylinder, it can remain in the oven from 5 hours up to 12 hours on a graduating temperature scale. This graduating scale begins at 300F for 1 hour, slowly moving up to 700F for an hour, then up to 1350F-1500F (depending upon the piece) for 2 hours. At this temperature the entire piece becomes glowing white-hot. The wax (obviously) has melted out and completely dissipated, including the gasses and other trace elements that may have been left behind at lower temperatures. After 2 hours at 1350F to 1500F degrees, you then bring the temperature down to the casting temperature. This is going to be based upon the size of the item. If you have a filigree piece that is very fine and delicate work, you cast at a higher temperature so that your gold stays liquid and molten throughout the entire casting stage. If you have a heavier piece that is thicker in design, you will want to cast at a lower temperature so that the gold does not boil or bubble so that won't create pits. In the filigree styles, we recommend casting at about 1000F. When doing heavier pieces, we recommend casting at about 850F – 950F. The gold is then put into a crucible that is then heated until it is molten. Gold, depending upon its karat, melts at approximately 1650F. Again, karatage does impact this. It can be at a lower temperature if it is a lower karatage.

Once gold has melted, it creates a mirror-like ball. When you have this mirror-like ball in your crucible, you know it is free of debris and impurities that will cause problems when casting. And then you can use a vacuum-assist method or a centrifugal method. The centrifugal method is just as it sounds; it is a spring loaded, counter balanced weight that the machine, when it is released, literally spins the gold into cylinder by way of centrifugal, gravitational pull. Vacuum casting is a vacuum assist where the cylinder is placed on top of a vacuum

device that draws the air through the porous plaster material. When you pour the molten gold into the hole, which was at the base but is now flipped upside down, the gold is allowed to fill the cavity, which was once filled with wax. In either situation, vacuum casting or centrifugal casting, the void is filled with the gold and you have an exact replica of the wax prototype that went in originally. After a period of waiting (several minutes), the cylinders are then quenched into water where the plaster will be removed and bathed in special solutions. The item is then ready to be cleaned and polished. This is a bit of an oversimplified explanation of casting, but one that is usually very interesting to most of our clients. Once the original prototype has been manufactured in metal, it can then be cleaned and polished and have a rubber mold made. Once a rubber mold has been made, a wax prototype can be made by simply injecting the mold with molten wax, as opposed to having to re-carve a new wax.

I hope you benefit from this information. I would like to invite you to come and visit us here at MSG Jewelers, Inc. to find out more about this interesting subject of custom manufacturing. Have a safe and happy St. Patrick's Day – which just so happens to be my 44th birthday this year!

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