

Manufacturing Platinum Wire By Hand

By: Christian Tse

Introduction

Platinum has many positive characteristics. One is the working of platinum by hand is similar to most 18 karat golds. With respect to melting, annealing and casting, the differences are very clear. Platinum alloys are oxidation resistant, formable and easily annealed. It is very important to maintain cleanliness to avoid contamination that leads to brittle.

For the most part, when drawing platinum wire in small quantities you will be cold working. Keep all tooling clean. Do not use excess lubrication. Keep roll surfaces and dies highly polished. Clean drawplates of beeswax, other lubricates, and metal particles that could damage a high finish.

Tools

The following are tools and materials you will need to manufacture platinum wire: a cylindrical block of steel or an anvil, drawplate, drawtongs, rolling mill, two-pound mallet, Wesco platinum crucible, 12" to 18" long multi-port tip torch with propane and oxygen mixture capable of melting platinum and standard welding equipment (eye protection apron and gloves).

Cleaning & Melting

Start by pickling the platinum in a mild nitric acid for at least 15 minutes. This will avoid cross-contamination from residual materials. Melt the platinum using the force of the flame to stir the metal. Make sure that platinum is completely molten. Let it cool for about 10 to 15 seconds and then quench the crucible in water. You will now have separated the platinum from the crucible. Grind or file off thoroughly the silica stuck on the moon-like craters on the bottom of the metal. Place the platinum button with the craters facing upwards on the reverse side of the crucible.

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Take the torch and heat the button until the surfaces becomes molten. This is to eliminate the surface pits and to push silica the edge. Use a circular motion with the flame until all the pits and surfaces holes are filled. Take caution not to over melt the platinum. You should now have a smooth surface on the platinum button.

Forming

Quickly move the button with a pair of tongs to the steel block and start hammering the button to a rectangle rod. When the platinum button has been reduced 50 percent of the button size anneal it. Heat the platinum to a bright red and hammer it again to the desired shape. After forming the rectangular shape heat the platinum so that the surface is smooth at all sides, taking caution not over melt the platinum.

Rolling

The platinum can now be rolled down into the wire side of the rolling mill. A few notes when rolling: roll in the same direction as started, reduce the rolling mill about 1 millimeter per pass (all side of the square). Roll the platinum until you achieve the approximate desired size wire.

Drawing

Before drawing, use a bright blue oxidizing flame to anneal the platinum. To avoid damage to the drawplate openings, the wire should be clean and free of residual firescale which can result in an defective draw, scratched wire. Mount the drawplate in its longitudinal direction clamped horizontally to a vise to a well anchored bench. The drawplate must be mounted at hand pulling level.

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The first step in drawing wire is the forming of a tapered shape at one end of the wire so that it can pass through the beginning hole of the drawplate. The tapered wire should protrude at least 1/4 inch at the drawplate's face so that it can be pulled without breaking off. Lubricate the wire with beeswax or *Bur-Life*. Grasp the wire with a drawplate tong or drawtong and pull the wire through. It is important to draw perpendicular to the drawplate and avoid jerky pulls. Damage will occur if the wire is drawn at an angle. Remember to draw the wire all the way through. Refile the tapered end if it breaks off. Repeat the drawing process successively passing through the openings until you have reached your desired size.

Final

Anneal the finished platinum wire in a coiled form. In the process of annealing you are also burning off the wax on the platinum. The platinum can be air cooled or quenched in water after annealing.