# A FIELD TEST

By Kevin Hoagland

## GPK'S KWIK KILN 6

*Smelting your own gold just got a lot easier*

There are many facets of mining that go hand in hand with prospecting that I truly enjoy. One is working with furnaces to reduce metals to their purest form. There is something very gratifying in taking my fine gold and changing it into another form.

Gold is an amazing element because no matter what you do to it, it's always gold. Smelting gold to make buttons, coins or whatever is just plain fun.

I prefer to smelt my own fine gold. Gold is a business for me and when it is time to sell fine gold, I want to receive the highest value possible. Years ago, it was an acceptable practice to sell your gold to the local prospecting shop. Many prospectors still do this and that is always an option. But with gold prices being at more than $1,200 per troy ounce, many shops are becoming more selective as to what they are spending on customers' gold.

Then, there are the "Buy Gold" shops that have popped up everywhere. Generally, they offer a great business plan for the buyer and a horrible deal for the seller. These shops buy on a percentage of purity only, and in many cases when they do buy raw gold, the "unknown purity, processing and whatever else" reductions are so great that unless there's a true need to sell your gold, it's not worth it.

By smelting and pouring my own gold, its purity can be checked instantly with either an acid scratch test or by electronic testing equipment that has become affordable to just about anyone these days. With a gold bar in hand, I know exactly what I have walking in and I know the value I expect to receive.

### GPK — A history created out of need

A few years ago, GPK Company came to the spotlight by creating a microwave kiln for smelting metals and performing fire assays. The first product was a microwave kiln that was quickly followed with the creation of the KK-4 which GPK calls the Kwik Kiln.

The KK-4 kit comes complete, minus propane and something to smelt, of course. The Kwik Kiln has seen fantastic success with more than 3,000 units sold over the last two years. That's four Kwik Kilns a day and the demand is not slowing down.

Ready for the furnace

I have used the Kwik Kiln on many occasions and truly understand why it's quite possibly the highest selling kiln of all time. It is fast, easy to use and in the long run I can make a pour of any metal for pennies in cost. Practice makes perfect, and to do a handful of pours for a couple of dollars makes practice not only perfect but affordable as well. Yet, for me, I've found one major drawback to the KK-4 Kwik Kiln—its size. It is a small unit, highly portable and great for doing small pours.

GPK followed the massive success of the KK-4 with the KK-8, which is for all intents and purposes an industrial kiln. It handles a great deal more material than most of us in the prospecting realm will ever need, and it does take a specialized burner and a much bigger fuel source. For me, it's too big. Plus, I already have a large furnace that I rarely use because of the cost to operate. As if GPK heard my wish list for the perfect furnace, the KK-6 was born.

## Tossing out the rules

I generally follow certain self-prescribed rules for conducting field tests. One is to have no contact with the manufacturer prior to or during the testing. To test the KK-6, I decided to break this rule for a couple of reasons:

- Firstly, this is a kiln. There are inherent dangers associated with almost any aspect of mining, and adding 2,000-plus degrees to the mix calls for great respect and attention to even the finest of details.
- Secondly, I have had little formal training in smelting. What I've learned has been mostly on my own. Given the extensive background of GPK founder Patrick Moulton in fire assay, smelting and recovery of precious metals, I wasn't going to miss an opportunity to learn the art of smelting from a true master of his craft.

## Fire it up, but FIRST ...

Arriving at the GPK manufacturing facility, I was greeted by both Patrick and Caren and given the tour. The manufacturing area is straightforward, and I was surprised to find out that all GPK products are built by hand by one man—Patrick. Given the demand for GPK products, I expected to find a number of employees manufacturing and cranking out kilns of all sizes. Patrick handles everything in production, and I stress *everything*. And Caren, well, she handles *everything else*.

Patrick and Caren are rightfully proud of the GPK name, its products and their reputation. They feel that they must have their hands on every unit built. And, I can assure you that there is no better quality control than that of the owners themselves.

Sitting down with them, I quickly learned GPK came into being because its products fulfilled a need. The first GPK product was the microwave kiln, which Patrick invented to perform simple and efficient fire assay work. He has also written a book, *A Practical Guide to Modern Alchemy, the Art of the Microwave Fire Assay*, on the subject for the professional and those interested in fire assay. It's a great read for anyone interested in assaying. I highly recommend it.

## The Kwik Kiln 6

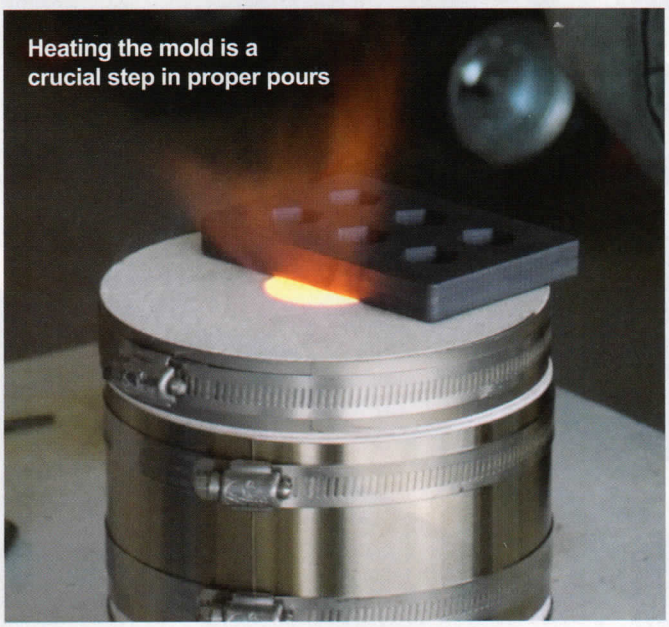
The Kwik Kiln 6 was next on the agenda. Since I had not yet seen the unit, I expressed hopes that it would be the Goldilocks answer—that perfect fit between the KK-4 and KK-8. As it turns out, it is!

In appearance, the KK-6 is the KK-4, except larger, which is perfect for current Kwik Kiln users. Designing the KK units to look and function the same was Patrick's goal.

Treat everything as if it is hot, because it is.

Charging the crucible

Time to add gold



Heating the mold is a crucial step in proper pours

Plus, those of you who are current KK-4 users, the crucible designed for the KK-4 fits perfectly into the KK-6 for those smaller pours. Most importantly, though, is that those new to smelting will "get it" quickly.

The KK-6 is hand built out of the same Alumina Silicate refractory sheet material used in all GPK products and is neatly wrapped in stainless steel. As a kit, the KK-6 comes to you almost complete. You'll need to purchase a couple of small propane bottles that are readily available in any sporting goods, camping or plumbing supply store, and two Bernzomatic TS400 torches or other brands rated at 6,000 BTU each. These are easily bought in most plumbing departments, and I found them online as well.

## Getting ready to smelt metal

Since most of you will be using the KK-6 in the most natural space, we moved to a garage and began setting up to make a first pour. I didn't read the instructions simply because I had used the KK-4 in the past, and I had the inventor in the room with me to cover every step. The KK-6 setup was intuitive. But, if you're new to smelting, read the instructions a few times before lighting the fire.

One of the successes that GPK has achieved is that Patrick has removed all of the science in smelting. The fluxes are designed for optimal performance, and the instructions list all the steps in creating excellent pours every time.

"The science is done," Patrick said. "From that point, it is common sense." Then, the trick is to "treat everything like it is very, very hot, because it is!" With Patrick doing the science of the kiln and flux, I found out rather quickly what I thought were great recipes for flux didn't really compare to what he has created. GPK flux just works better.

Let's talk about common sense here for a moment. There are a few items that you'll need to be safe when using any furnace. DO NOT place a furnace directly on a metal, wood or plastic table or workbench. Fire bricks or pavers are my top choice for covering a wooden workbench before setting down a furnace. Wear thick, leather welder's gloves and I always recommend that in addition to safety glasses that you wear a flip down face shield as well. No loose clothing, and always smelt in a ventilated space! Lastly, keep your head in the game at all times. There is nothing complicated about smelting metal with the KK-6, which means you need to have unwavering presence of mind because complacency is dangerous.

## My first KK-6 pour

Setting the kiln base on a flame-retardant table, I organized my work area up to use complete economy of motion. When using a kiln, you need to spend time in setting up the exact location of every step. Movement while pouring is calculated and precise. This is safety.

I did a cold run before lighting the torches to make sure that every movement was tied in with the final outcome—a good safe pour. With the KK-6, this is simple. A place to set the chamber, a place to pour into the mold and a place to set the crucible are all that's needed.

I fired up the torches, and placed them into the orifices on either side of the KK-6. You cannot just stick torches into the unit and let the fire go. By design, all KK gas kilns have a slight angle to the entry port for the torch head. This allows the flame to create a cyclone in the bottom of the kiln that looks like the center of a tornado. The cyclone (or vortex) is an important step to achieve; it creates evenly distributed heat up the entire column of the kiln which smelts the metals in the crucible perfectly, leaving no hot or cold spots in the crucible.

The next step is to stack the unit onto the base. Gloved up, I placed the center section and the lid on the base and let the unit start coming up to temp. Placing 31.0 grams of gold (that included black sand and some ground quartz) into the KK-4 mini crucible and using a half a teaspoon of Patrick's designed GPK Premium Gold Flux, I set the crucible on the edge of the KK-6 lid to warm up. My expectation was that given the size of the KK-6, it would take about 10 minutes until the furnace was up to temperature. Not so. In less than five minutes, Patrick and I both looked into the fire and agreed it was time.

Again, with gloves on, we separated the unit, I placed the crucible into the KK-6 and re-stacked the chamber section. When stacking the furnace, you have to ensure there is equal space around the crucible for proper heat distribution. Because of the wider chamber of the KK-6, this is easily done and is safer than any other gas furnace I have ever used. There is never a need to move the crucible after it's in the flame. I simply adjusted the center section of the chamber to ensure proper space, and set the lid.

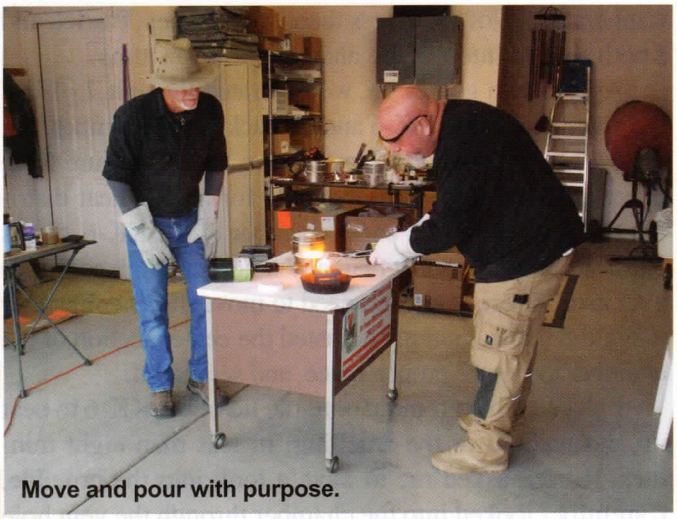
I placed the pour mold onto the lid of the KK-6 to heat up and waited for the smelting. In less than eight minutes, Patrick asked me to have a look into the crucible. Carefully I looked into the chamber through the vent hole to see everything in a clear molten state. It was perfect!

If this had been a larger pour using the standard KK-6 AO5 crucible and say two troy pounds of gold with flux, I still think I would have been pouring gold in under a half-hour from the time of lighting the torches.

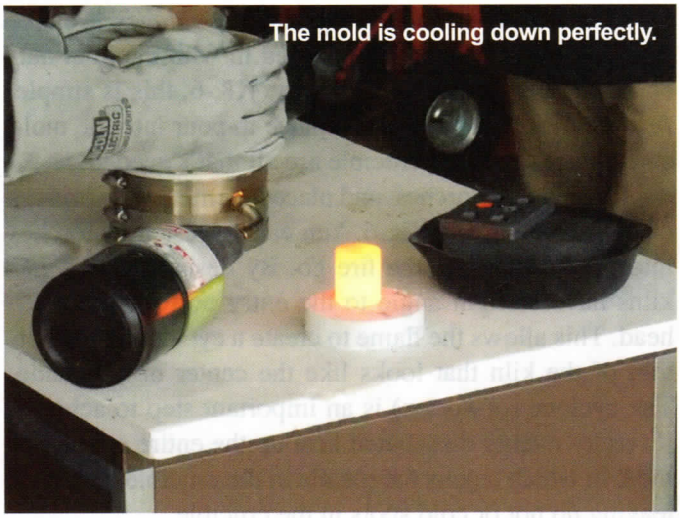
## Time to pour

I separated and lifted the chamber straight up and over, and sat it on the predetermined spot. Then, I firmly

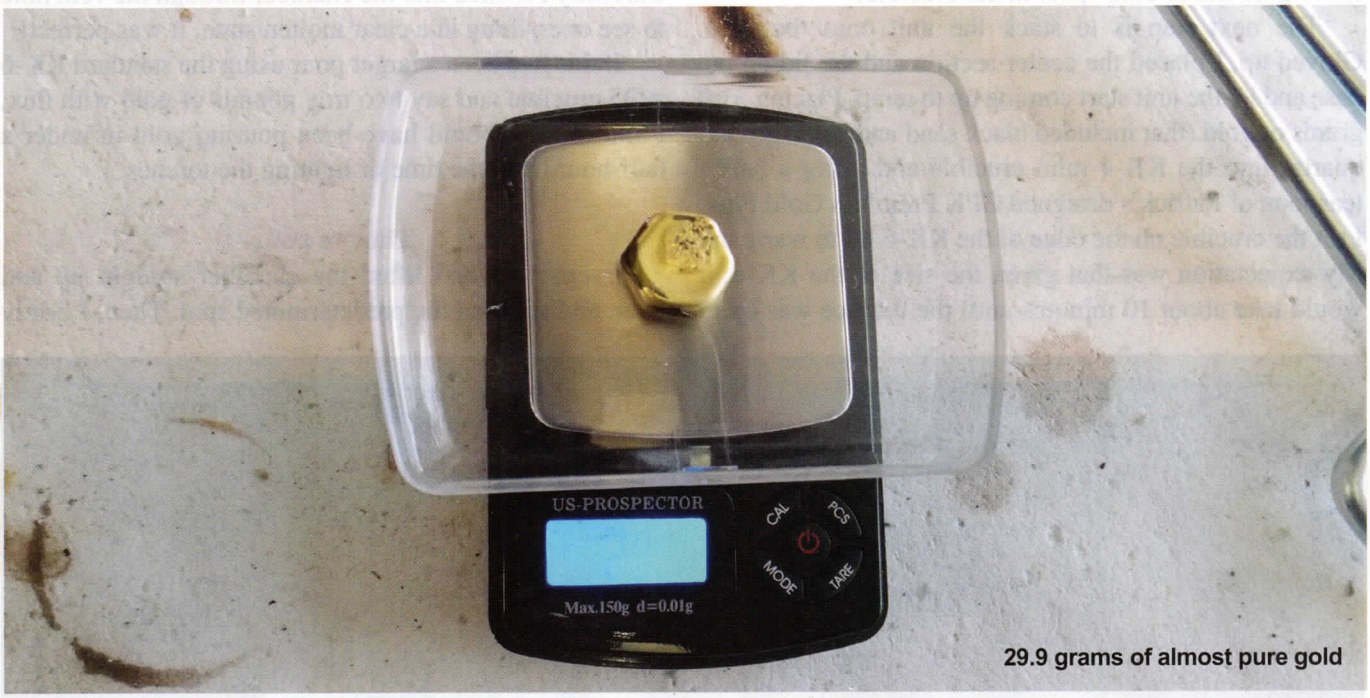
Making the pour



Move and pour with purpose.



The mold is cooling down perfectly.




29.9 grams of almost pure gold

grasped the crucible with the kit's tongs, lifted and moved it to the mold, poured purposely and sat the crucible down in another predetermined spot. Then, I re-stacked the KK-6, turned off the torches, and then waited for the pour to cool.

What dropped out of the mold was a perfect six-sided coin weighing in just a few grains less than what I had started with. A later electronic test of the coin showed it to be 99.99 fine gold! The impurities, as expected, were trapped in the flux or destroyed all together in the smelting process.

## Success, but wait there's more ...

Patrick and I spent the rest of the day smelting almost any metal we could get our hands on—sometimes more than once—while we talked about the science of smelting. Close to sunset I realized he was having as good a time as I was, and it dawned on me that we had spent the entire day smelting.

There is nothing complicated about using any GPK product. Patrick said it best earlier in the day: "I've done all of the science." The KK line of kilns are simple to operate and, with a little common sense, are safe. I wouldn't hesitate to take anyone new to furnace work into the garage and have them do everything from setup to pour.

## Pros

- Easy to use for professionals and first-time users
- Extremely low cost to operate
- Fast, efficient smelting of all metals rated to 2200° F
- Choices in crucibles to use in the KK-6

## Cons

Let me know if you find any. I didn't!

*Kevin Hoagland is the host of the GPAA-produced TV series Gold Trails and the Executive Director of Development for the Lost Dutchman's Mining Association. He can be reached at khoagland@goldprospectors.org.*