

→ = Advance Power Point Presentation (click mouse)

- 1) Introduction
  - a) Opening slide with rotating images of enamels
  - b) Hi my name is Pam East, and I'm a Master Instructor for Art Clay Silver.
  - c) Two years ago I wrote a book called Enameling on Metal Clay, which I know many of you have. Some of you are no doubt ready to take it a step or two further now; some may not have tried enameling, but are anxious to give it a go. All of you are very welcome here today.
  - d) Today's talk is not instructions for enameling, but rather I'm going to address issues, concerns and challenges that are a common part of the enameling experience. I've reserved some time at the end of my presentation to address the questions about enameling that you may have brought with you today. Please hold the questions until then.
- 2) → How many of you like this piece? This is one of my first enamel on metal clay pieces. It taught me a lot of lessons about the challenges I'd be facing as I pursued the medium. Poor thing has really been through the mill. You can see all the pits and dents from getting tossed around in my sample case. It's still one of my favorite pieces. Keep it in mind as we go through my presentation. We'll be returning to it.
- 3) Which Metal Clays can be enameled?
  - a) Ok, let's start with the basics. And the most basic question is, what can be enameled and what can't.
  - b) → Most metal clay formulas are suitable for enameling, however there are two exceptions.
  - c) You don't want to use PMC Standard Formula as it's too porous and will result in a lot of bubbles in your enamel. I've seen it come out almost foamy.
  - d) Also, Bronze clay can not be enameled. The enamel will just chip off.
- 4) Designing Silver for Enamel
  - a) → One of the first things I'd like to address is silver design for enamel. I've noticed a tendency in the metal clay community for people to make a piece, and then decided "oh wouldn't that look cool with some enamel on it". This is really a cart before the horse approach to enameling and it can end up causing you a lot of grief. If a piece is not designed with enamel in mind, a lot can go wrong. Oh sure, sprinkle it with enamel, put it in the kiln, and the enamel will stick, but that doesn't mean you'll like what you end up with. A little advance planning can save you a lot of trouble down the road.
  - b) → To start with, the silver should be a uniform thickness. During heating and cooling, thick areas will expand and contract at a different rate than thin areas. Enameling over those variations will result in cracks.
  - c) → The edges of your enamel should not be sloped. This will result in cracks along the line marking the change in depth. Stamped images usually have sloped sides. You can get away with this if you are only using one or two thin layers of enamel, but if you want to do Champlevé, with deeper shaded enamels, you need to use a fine file to straighten out the side walls during the greenware stage.

- d) → I use Photo Polymer to make all the silver for my Champlevé work. Unlike rubber stamps I can get a very straight edge with it.
  - e) → There shouldn't be any areas where the enamel will undercut the silver. Again, this will result in cracks radiating out from the undercut area. Syringe work and stacked pieces are notorious for this, but as long as you are thinking about enameling in advance, you can fill the gaps with paste in the greenware stage.
- 5) Leaded vs. Unleaded enamel
- a) → Advantages of leaded enamel
    - i) Here in the US we seem to go nuts at the mere mention of lead, but it's not wholly evil. The main reason it's no longer manufactured in the US has to do with the safety of the manufacturing plant workers than with the end user. Handled correctly, it has a lot of benefits.
    - ii) → Lead increases the refraction index in glass. That means the colors appear brighter and clearer. That's why lead crystal is so much brighter and sparkly than plain cut glass.
    - iii) Lead is a color stabilizer. Leaded enamels can be fired more often than lead free enamels before the colors start to degrade. A fine art piece may be fired in excess of 50 times. Lead free enamel colors would start to break down far before that. For most hobbyists this isn't an issue. You're unlikely to fire something more than about 10 or 12 times, which is well within the capabilities of lead free enamel.
    - iv) Also, because of the color stabilization, leaded enamels come in a broader palette of colors. There are quite a lot of colors you just can't get in lead free enamel.
    - v) → The main issue with leaded enamel has nothing to do with the finished product. For the record, you can NOT get lead poisoning from wearing jewelry with leaded enamel against your skin. Heck, you could put it in your mouth and suck on it for a week and not get any appreciable lead out of the glass. It's fixed once fired. The only time it's an issue is in the handling and firing of the enamels. During firing a small amount of lead fumes are released. You can deal with this by pulling the vent plug on your kiln, if it has one, and by venting your studio. I have a built in vent fan over my kilns that blows the studio air to the outside, however a box fan in a window would work just as well. When handling the powdered enamel, you don't need to be worried about absorbing lead through your skin, but you should take care to wash your hands when your done so you don't end up ingesting it when you eat. You also should use a damp rag for wiping up enamel spills, rather than dry dusting which puts it in the air where you can end up breathing it. As far as breathing goes, the silica in the glass is more of a danger than the lead. Damp dusting and mopping goes for lead free enamel just as much.
    - vi) I have friends who have been enameling full time with leaded enamel for 30 years and more, and none of them have higher lead levels in their blood than anyone else. With a little care it's perfectly safe.
  - b) → Advantages of lead free enamel

- i) That said, lead free enamel is not without it's benefits.
  - ii) → I only teach with lead free enamels for a number of reasons. First, I'm often in hotel conference rooms or other venues without adequate ventilation.
  - iii) Lead free enamels are made here in the US, as opposed to leaded which is all imported. It's easily available from a variety of distributors and a bit less expensive than leaded enamels. This makes them very attractive, especially for beginners.
  - iv) Also, I've found most of my students, especially beginning students, are a bit skittish when they hear the word "lead". In our litigious society, if even one student in a class has a problem with lead, it can throw a monkey wrench into the works. I've found it's much easier to just avoid all these issues by sticking with lead free.
  - v) And the fact is, lead free enamels really are lovely! Thompson Enamel manufactures over 140 colors of lead free enamel, so there are plenty of colors to choose from.
  - vi) For most students of enameling, you are probably not going to really notice the differences until you get to more advanced techniques.
- 6) → Warm colors on Silver
- a) Color reaction
    - i) One of the most common issues facing enamelists is how to get warm colors, such as reds, pinks, and oranges, to fire on silver without discoloring. Silver is, itself, a colorant and imparts yellow and brown to enamel. It can also cause certain colors of transparent enamel to turn opaque and muddy.
    - ii) It's important to note that enameling on silver clay is not exactly like enameling on sheet silver. The porosity of silver clay means that more silver salts are released into the enamel than on sheet silver. This can intensify color reaction issues.
    - iii) This pendant (folk-art sun) was my own first encounter with this phenomenon. I actually love this pendant now, but at the time it was very discouraging. I had been going for transparent red, orange and yellow. As you can see, I got the full spectrum of problems... both discoloration and severe clouding. The good news is solutions exist, both for leaded and unleaded enamels.
  - b) → When working with leaded enamels, there are several formulations of a variety of warm colors that are intended specifically for silver. On this pendant I used Nihon Shippo G704 raspberry red and some Ninomyia yellows and purples for silver. Michela made these earrings with Aoki 105A. Unfortunately Aoki is out of business so you can't get that one anymore, but if you have a chat with Coral Shaffer at Enamelwork supply she can direct you to a variety of other warm colors formulated for silver. It's important to note that not all leaded colors are going to work directly on silver. You do have to request the ones that are made for silver.
  - c) → You can still get warm colors that are not specifically formulated for silver to work though, in either leaded or unleaded, by firing them over flux. Tina Carvalho had great success by firing three layers of Thompson 2020 Clear for Silver first, then following it up with three layers of Thompson Woodrow Red.

- d) → On the back side of the piece she only used two layers of Woodrow red, and you can see the effect isn't quite there. It really needed the three layers to get to the solid red color.
  - e) → Here's my own attempt at this technique. I got rushed and only used two layers of 2020 clear for silver instead of three. As you can see, even after three layers I did not get as good a red as Tina did, but it's still a nice piece. This area in here is a pale pink, which is another difficult color to achieve on silver.
  - f) → Another technique that works well for both leaded and lead free enamel is to apply the color over gold foil. It's tricky but this technique probably offers the best results
    - i) Start by firing on a layer of clear flux
    - ii) Then apply the gold foil to that. You can use water to get it to stick down. I apply the gold patchwork fashion rather than trying to cut a piece to fit. Dry it and then fire it, and the gold will stick to the clear enamel underneath.
    - iii) Apply and fire another layer of clear over that, and then you can add whatever warm colors you want. This is a shading of Thompson lead free egg yellow, mandarin orange, sunset orange, and Woodrow red. I applied three coats of the colors.
  - g) → Here's an example piece I did to show the differences. All of this is Woodrow Red. The first spot was fired directly on silver. The second spot was fired over one layer of 2020, The third spot here is over 3 layers of 2020, and the last spot is over gold. You can see what a dramatic difference it is depending on how you apply the enamel.
- 7) → Size matters
- a) I'm talking about enamel particle size of course. What were you naughty people thinking?
  - b) → When you buy enamel, you get what is commonly referred to as 80 mesh. This means the enamel has been passed through a screen with 80 holes per linear inch. You get everything that fits through that screen, from the 80 mesh size pieces down to the finest dust. The very smallest particles are called "Fines". The don't make a lot of difference with opaque enamels, but with transparents they will cause your enamel to look cloudy, or translucent instead of transparent.
  - c) → The easiest way to remove the fines is to screen it. I usually use a 200 mesh screen. I recently learned a new trick for keeping this process from putting a lot of glass dust in the air. When you buy your screen, also buy two of the "solid" caps that go with them. Then stack your screen between the caps. You can shake it to your hearts content and no glass dust will escape. Be careful when you open it up though, as some will inevitably come floating out at that point.
  - d) Put a quarter in with your enamel when you screen it, and it will help push the enamel through the screen. Remember, you want to use what stays on the screen, not what comes through it. The super fine stuff that comes through the screen can just be discarded.
  - e) If you're doing Basse Taille and you want to really be able to see the texture under the enamel, you can take the screening one step further. Instead of using the 200 mesh screen, use a 150 mesh AND a 325 Mesh. Put a quarter in each screen

and stack it up. Use the enamel that falls between the two screens. This would be called 150/325 mesh enamel. It's a much smaller particle size than you get with just a 200 mesh screen, which is essentially 80/200 mesh. The smaller particles pack together very tightly and make for very clear transparents.

- f) → Here is an example of the difference screening makes. This piece was made with unscreened 80 mesh enamel. You can see there is a pattern under there, but just barely.
  - g) → After screening with a 200 mesh screen the clarity is much improved and the pattern is much more apparent. And this last piece was made with the 150/325 mesh. All hazing is now gone.
- 8) → Shading.
- a) The one technique I'm asked about the most is shading, and it's probably one of the easiest. Getting a graduated shading in enamel is mostly just a matter of layering. The trick is in how you step the layers.
  - b) → Working from one end to the other, lay down dark, medium and light colors and fire it.
  - c) On the next layer, lay down less of the dark, move the medium up so it overlaps the dark, and move the light up so it overlaps the medium.
  - d) Continue stacking layers in this fashion for at least 3 or 4 firings and you will end up with a smooth, graduated shading from light to dark. Your last layer may be only the very lightest color.
  - e) If you only have room on your piece for one or two layers of enamel, you can fake it a little by blending the enamel where the two colors come together.
- 9) De-enameling
- a) Let's talk about de-enameling.
  - b) → The first thing I want to do is try and talk you out of it. Since my de-enameling technique appeared in my book two years ago, I have found more and more people trying to use it as an all purpose eraser. They don't like the color, or there is some other minor imperfection, so they de-enamel and start over... and often encounter problems as a result.
  - c) → De-enameling is not cost free. There is an impact on the metal. It will become pitted, it may resist re-enameling, you may encounter increased color shifts and pulling. That's why de-enameling is always the court of last resort. You should only be turning to de-enameling if the only alternative is throwing the piece in the recycle bin.
  - d) → Process
    - i) De-enameling is easy enough to do. Just mix equal parts Cream of Tartar and table salt, and add enough water to make a thick paste.
    - ii) Apply it thickly to the enamel and fire it at 1450 for 2 minutes.
    - iii) When you take it out, immediately plunge the piece in cold water. All the enamel will come off.
  - e) → Now what
    - i) At this point you may be able to re-enamel it, or you may not.
    - ii) You can improve your chances somewhat by re-firing the piece. Scrub it first to get all traces of enamel and blackened paste off of it, and then re-fire it at

1600 for 10 minutes. If ANY black shows up during the re-firing, you may need to de-enamel it again. It should be clean and white at this point.

- iii) Then be sure to tumble it for a couple of hours. You want to get it reburnished as much as possible.
  - iv) → At this point, it will probably re-enamel ok. But if it doesn't, I suggest moving on to a different technique. Use epoxy resins, or colored pencil, or patinas. There are many ways to color silver jewelry that don't involve enameling, and something that's been de-enamelled may be a good candidate for that.
- 10) → Appreciating unintended results
- a) But more than learning how to de-enamel, I want you to learn to appreciate unintended results. Enameling is not an exact science. Being open to the varying results is part of the process.
  - b) Remember this piece from the beginning of the presentation? At first I was deeply disappointed in it. Had I known about de-enameling back then, I might have tried to take the enamel off. And I'd have lost something really special as a result. You can't believe how many compliments I get on it. People think it looks like inlaid stone or amber. It's now one of my favorite pieces and I don't think it would look half as nice if the colors were a garish red, orange and yellow.
  - c) Remember when looking at your own work, no one knows what you had in your head. They are not making the comparisons you are. If you have a piece that didn't come out the way you wanted, put it aside for a while. You might find that it grows on you over time.
- 11) Q&A