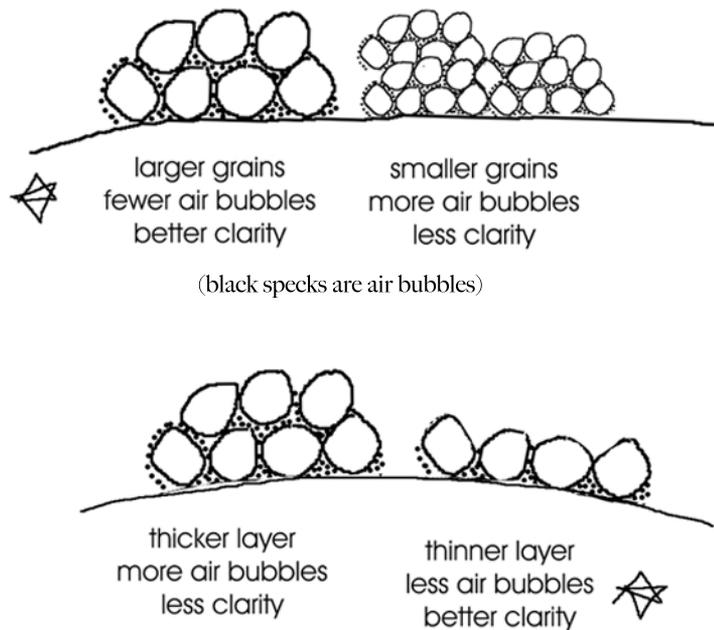


Air Bubbles and Clarity

The key to having clear transparent colors is to consider the two factors:

- 1). Particle/grain size
- 2). Thickness of the layer

To prepare your transparent enamels for a wet application, you'll need to remove the finest particles. Air bubbles cause cloudiness in glass. The more fine particles, the more air bubbles will be present in the layer, as air bubbles surround each grain of enamel.



Rinsing out the Fine particles

If I am using 80 mesh enamel straight out of the jar/bag, I always grind it up slightly with a mortar and pestle, using water. Most often I use ordinary tap water (I've had to use distilled water once when enameling in the desert city of Tucson, AZ). This breaks down the grains slightly removing any older surface enamel which may not be as clear as the inner part of each particle. I then pour this into a 1 oz medicine cup and swirl it around to get the finest particles to float in the water, while the heavier grains fall to the bottom of the cup. I pour out the water, being careful not to pour out the larger particles. I pour the water into a plastic shoebox or bucket so that the fine enamel grains don't go down the drain to contaminate the drain and clog it up. Repeat this process until the water is crystal clear, with no fine grains floating around in the water.

Grinding enamel from lump.

I prefer to use lump form enamel for several reasons:

- * It has an unlimited shelf life
- * It is always crystal clear
- * the particle sizes can be bigger, giving me less air bubbles
- * it last longer after I have ground it up while sitting on my desk
 - * use a solid mortar, not a hollow one
- * the best I have found is made of aluminum oxide from CoorsTek

Creating a Transparent Gradation

Transparent enamel gradations are created two ways:

- 1) How one color looks next to another
- 2) How one color looks when fired over another.

Try to think of each grain of enamel as a “color layer”, or a single pane of transparent glass.

Each grain has an edge; this is the perimeter of the grain. Where edges of grains meet when they are the same color, there is no line created. The closer in hue and value two different grains are, the less you are able to notice a “line” where they meet. Unlike paints the individual grains will not melt into one another. Each grain will melt where it lies, and create a “salt & pepper” effect. The closer in hue/value the grains, the less pronounced the salt & pepper” effect. When you fire one layer over another, you will be looking down through one pane of colored glass to another. A lighter color over a darker color will not be very noticeable. A darker color over a lighter color will tint /change the color on the bottom.

Blending Considerations: Creating gradations without Lines

1. Hue: what color is the enamel? Where on the color wheel is it?

The closer the hue, the easier the enamels will blend seamlessly; without a line being visible.

This means that the closer they are together on a color wheel the better they will blend together

Blending red into orange into yellow will be much easier than blending purple into yellow.

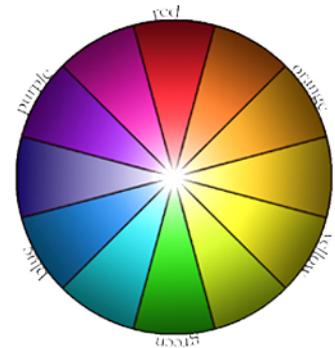
2. Value: how dark or light the enamel color is, regardless of opacity

Similar to Hue, the closer two enamels are in value the easier the gradation.

A dark green will blend into a dark red easier than a dark red into a light green.

Two light value colors will blend more smoothly than two darker value colors.

It is easiest to blend light values, as you can even blend complementary colors (opposites on the color wheel) if they are light enough. You can create lighter values of colors by using thinner layers or finer grains of enamel.



3. Opacity/Transparency

Transparent colors will blend better into each other than opaques and opalescent enamels since the edge created by individual grains or partial layers is less pronounced with a transparent enamel.

4. Particle Size: How small or large are the enamel grains you are using?

The smaller the particle size (grain of enamel), the lighter in value it will be.

The smaller the size the less of a “mark” it will make on the surface, more easily blending into the background color.

Transparent Color Gradations Part 2

5. Thickness of a transparent Enamel Layer:

The thinner the layer of enamel the lighter in value it will be, which will make it easier to blend into either another layer next to it or underneath it. You can angle a layer from thick to thin to create a gradual transition of the same color as long as you don't make it so thick that you lose clarity due to excess air bubbles..



6. Placement of Enamel Grains

You can use your brush or other tool to mix the grains where two colors are meeting, creating a "salt and pepper" effect. The smaller the particle size and the more close in value and hue the enamel particles are, the more smooth the gradation. You could also mix a separate third color by grinding together equal amounts of two different colors and using this enamel to connect the two original colors.



7. Placement of Enamel Layers

When firing a second transparent layer of transparent over a similar transparent layer, start with the darkest enamel color and bring the edge of the top layer past the edge of the first layer.



8. Direction of Enamel Layers

Curve the gradation of colors along the line which you want the eye to move.

Technical Design Considerations

Understanding what the materials want to do

You must take in technical issues when designing. Any material you use will have it's own set of characteristics or peculiarities which must be considered in the design process.

Chemical Reactions

enamel reaction to metal base: how does enamel react to various metal backgrounds?

Application of Enamel Layers

transparency: thin layers for clarity

value of transparent enamels: thin layers for darker tranparents

Order of layers: working from light to dark

tapering for shading

base opaque coats proper thicknes

Preparation of Enamel Colors

grinding desired particle size

washing enamel for desired clarity: removing "fine" particles

containers for holding enamel (medicine cups)

quality of water for rinsing: tap water or distilled water

aged of prepared enamel: how long has it been left out, dry or wet

Firing

kiln type

temperature of kiln

screens and trivets

Firing Enamel Layers

Firing to desired stage: sugar, orange peel, glossy, over-fired

Filling Cells to Height of Wirework

choice of enamel flux (colorless enamel)

thickness of layers

how many layers

when to stop and begin "finishing" process of grinding and polishing

Grinding and Polishing Methods

choice of tools

choice of coarseness sandpaper grit

how worn is the sandpaper

possible problem areas to plan around