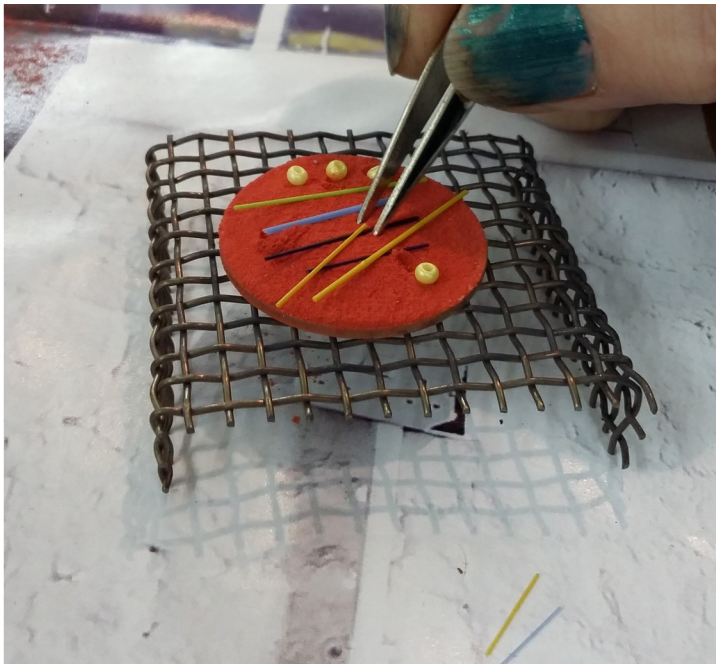
ENAMELLING ON COPPER

MATERIALS:
- Copper or silver sheet
- Enamel powders
- Decorative media
- Enamel transfers

TOOLS
- Sifter
- Wire racks and pigs
- Kiln
- Kiln fork
- Palette knife
- Quench pot
- Emery papers



HEALTH & SAFETY

Enamel is powdered glass. Make sure you use it sparingly and in a controlled manner. Return any extra to the jars as soon as possible, keep you work area clean and handle the powder as little as possible. Don't touch your face while you are handling the powders. Make sure you wash your hands thoroughly after use. Gloves and dust masks are advised and available.

The enamelling kiln and tools heat up to 850 degrees and more. Beware of hot tools – particularly wire mesh stands and pigs.

Be aware of others in the workshop environment. Keep tools in work areas and be controlled in your use of them.

Enamelling is a process of fusing glass powder to metal using heat and has been used in jewellery since ancient times. The type of enamelling we will be looking at is called sifted enamel. The ground glass powders are sifted dry onto the copper surface in much the same way as you might sift icing sugar over a cake. The dry powders can be combined and layered to give different effects. Enamelling powders can also be wet packed, dipped or applied as a water colour type paint. We use a kiln to fire the enamels at between 790 – 830 degrees. Enamels can also be fired using an open flame torch.

Enamel comes in opaque and transparent colours. Each pot will be labelled with the colour and type of enamel. Opaque and transparent can be used together in the same piece but beware – much like ceramic glazes the colour of the enamel powder is not necessarily the colour it will be when fired.

PROCESS

1. Before you start enamelling your metal, usually copper, must be shaped and ready. Because enamel is a very brittle glass surface you can't reshape or drill the metal piece once the enamel is applied. Think about how your piece will be used and make sure it is shaped, drilled and finished **before** you begin enamelling. EG – if you are making a leaf shaped drop earring make sure you have pierced the leaf shape, drilled a hole to take the ear wire and sanded down the edges before you begin.

2. Cleaning your metal.

The metal must be clean to allow the glass to bond with it and coat it properly. Dip your metal piece in fresh water – if the metal beads on the surface the metal is not clean.

Use emery papers or pumice cleaner to abrade the surface and remove all grease. If you metal is an awkward shape you can always pickle your copper to remove the dirt and oxides.

Use the dip test to check it's properly clean. Once the metal is clean try not to touch it too much.

Let it dry or use some kitchen paper to dry as much as you can

3. Applying the enamel powder.

Enamel is made from powdered glass and comes in two main types – opaque and translucent. Opaque powders leave a solid layer of colour, translucent will show through what is behind.

Colours can be mixed but because the powder is granular the effect will be almost pixelated up close rather than blended completely. **The fired colours can look very different from the colour of the powders.**

You can combine opaque and translucent enamels in the same piece.

Take a piece of paper and fold a create down the centre and then open out again. Lay your clean piece of copper on the paper.

Use a palette knife to put a small amount of the enamel powder into a sieve holding it over the copper shape. Gently tap the sieve with the palette knife and shake a thin even layer of enamel over the copper. You want an even covering which is enough to cover the copper but not too thick.

You can put different colours together on the same piece. They will bleed together during firing. You can also
layer colours in separate firings.

You can add decorative media such as small glass beads, millifiore or glass rods to your design.

Use the pallette knife to carefully transfer your shape to a wire mesh.

Put any excess powder from the paper back in the pot and replace the lid.

4. Firing your piece

The kin runs at about 850 -900 degrees. Things stay hot for a while when they come out but don't look hot so be careful

Use a firing fork to gently transfer the piece on it's stand into the kiln.

The firing time varies depending on the size and volume of the piece, the amount of enamel on it and the temperature of the kiln. With a bit of practice you will be able to judge roughly how long a piece will need.

To start with leave your piece in for on minute. Open the door and take it out to check it's progress.

The enamel will become sandy looking, then begin to melt to an
orange peel texture, it will then flatten off and become smooth
and glassy. As soon as it looks smooth remove it from the kiln
and leave to cool

It's fine to take a piece out and then put it back in. You can continue to work on pieces from previous sessions quite successfully. Enamel is quite stable and generally will take well to repeated firings. Some colours are ore delicate than other, the warmer end of the spectrum is generally a little more sensitive so you may want to do those colours last.

Once the powder has fused to the metal and coated it you can decide whether you are looking for a perfectly smooth and even finish or something more textured or spontaneous. You can control the effect with the firing time.

Some colours will burn away or discolour quicker than others if over fired – the warm colours, reds, pinks and oranges seem generally more sensitive than the cooler colours.

Once the piece has cooled for five or so minutes you can quench it in cold water to make it safe to handle.

You can then go back and add another layer or design of enamel if you want to.

5. Enamelling both sides

Enamelling the reverse of a piece is known as counter enamelling. I usually coat the back of a piece first as it can be effected by subsequent firings and also can be left with trivet marks when you enamel the other side.

Enamelling the reverse gives the piece more stability and helps to stop the enamel from distorting the copper. It also protects the copper from oxidising and tarnishing

If it doesn't matter what colour your reverse is then use a layer of mixed counter enamel.

Clean, coat and fire the piece as described.

Clean off the fire scale and tarnish from the first firing and clean the second side.

Apply the enamel powder as before.

Sit your piece on one of the steel pigs or trivets, this leaves minimal contact between the first enamelled side and the support. If you place the enamel directly onto the mesh it will melt on the second firing and stick to the mesh and ruin your design.

If necessary put the trivet onto one of the mesh stands and fire as before.

6. Cleaning up

You can place enamelled pieces in the pickle to remove firescale but be as brief as possible as it can begin to etch away at the enamel and dull the surface.

Use emery paper to remove any darkened edges if you want to.

Design Ideas.

- Put two powder colours next to each other on the same firing – how do they blend?
- Try using cut paper as a stencil to mask off areas
- Use cellular adhesive to make a design to control the enamel. Painterly or graphic?
- Add in small glass bead or rods.
- Build up layers of colours or patterns in multiple firings
- Experiment with combining opaque and translucent colours