WHAT IS PICKLE AND WHAT IS IT FOR?

Pickle is the term used by jewellers to refer to an acid solution that is used to remove the black firescale that forms on alloys when they are subjected to heat.

Metal clay artists generally encounter firescale when sterling silver is fired in place or soldered on to fired clay pieces.

TYPES OF PICKLE

Jewellers generally use a dilute sulphuric acid solution or a solution of sodium bisulphate (the main ingredient in the commercial pickle called Sparex).

These versions are not suitable for the home environment in which many metal clay artists work, particularly if there are children around.

Many jewellers and metal clay artists use citric acid for their pickle solution – this is the acid that makes lemons and limes so sharp. It has several advantages over the traditional pickles including:

1. It is not poisonous – it is in all citrus fruits and is used in cooking and preserving
2. It does not put holes in your clothing
3. Fumes are not a problem
4. Unlike other pickles, especially sodium bisulphate solutions, steel tweezers and binding wirel will not contaminate the pickle and plate out copper onto the piece
5. It works effectively and well on silver and gold
6. It comes in powdered form
7. It is a safe alternative to traditional pickles
8. It can be used hot or cold

CITRIC ACID PICKLE

Citric acid pickle works best when hot, even in a low strength solution. It will also work cold, but the solution needs to be a strong one and it will take a lot longer.

Even hot, it takes a bit longer to pickle a piece clean than traditional pickles do.

Borax flux and glass reacts fairly strongly with citric acid and so may cause frothing for a few seconds. This is not a problem as long as the pickle container is not overfilled since the frothing subsides within a few seconds.

Avoid spills if at all possible. Spilt citric acid dries to a sticky residue which is a nuisance to clean up.

CONTAINERS FOR THE PICKLE

- A small slow cooker (one-person size) is a good container for holding your pickle. It can be left plugged in if required (with the lid on to reduce evaporation) to keep the pickle hot.
- A small Pyrex casserole dish with a lid can be used and kept hot on a warming tray or hotplate
- A glass preserving jar makes a useful container as it is small enough to stand on a cup warmer

MIXING THE PICKLE SOLUTION

The mixing ratios for citric acid and water to make an effective pickle vary between 1:10 and 1:3 by volume, depending on whether it is going to be used hot or cold.

The weaker (1:10) solution should be used hot while the stronger (1:3) solution can be used cold – although pieces may have to be left overnight if the cold option is used.

COURSE HANDOUT CITRIC ACID PICKLE

To 400ml of **distilled** water add

- 40ml of citric acid powder for a weak solution
- 120ml of citric acid powder for a strong solution

ALWAYS add the citric acid to the water, NOT the water to the acid. Use distilled water to prevent the growth of micro-organisms and the development of chemical deposits.

The exact strength that suits an individual is largely a matter of trial and error, but marking the correct level on the container with a permanent marker is useful when topping the solution up to make up for evaporative losses.

USING THE PICKLE

Read the safety instructions at the end of this handout first.

Allow the piece to cool before immersing it in the pickle. The solution is an acid after all, and splashes caused by dropping hot pieces into pickle can be harmful.

Once the piece is cleaned of firescale and flux take it out of the pickle and drop it into a saturated solution of bicarbonate of soda to neutralise the acid. There will probably be some fizzing as the remaining acid reacts with the bicarbonate. This neutralising is particularly important for hollow pieces and pieces made from metal clay, which is more porous than traditional forms of the metal.

Once the acid has been neutralised, wash the piece in clean water and dry it.

DISPOSAL OF SPENT PICKLE

Citric acid pickle, once used for the first time, contains copper citrate in dilution, the concentration of which increases with increased use. When the pickle loses its effectiveness or starts to turn blue, neutralise any remaining acidity with bicarbonate of soda. The neutralised solution can be flushed down the drains using plenty of water.

DO NOT pour it onto your garden as the copper compounds can be harmful to soil, plants and animals.

SAFETY DATA

Common synonyms	Citric acid monohydrate, 2-hydroxy-1,2,3-propanetricarboxylic acid
Formula	$C_6H_8O_7$
Physical properties	Form: White crystalline powder Stability: Stable Water solubility: high Specific gravity: 1.54
Found naturally in	Many fruits and vegetables, especially the citrus family. Citric acid may account for nearly 10% of the dry weight of certain varieties of limes and lemons.
Principal hazards	Contact with the eyes can cause serious irritation Repeated exposure can cause skin irritation or, eventually, allergic reaction, in some susceptible individuals
Safe handling	Wear safety glasses
Emergency	Eye contact: Immediately flush the eye with plenty of water. If irritation persists call for medical help. Skin contact: Wash off with water. If swallowed: Unlikely to be harmful unless the amount swallowed is substantial. If this is the case, call for medical help
Disposal	Small amounts of citric acid can be flushed down a sink with a large quantity of water, unless local rules prohibit this.
Protective equipment	Safety glasses.