ETCHING COPPER WITH FERRIC CHLORIDE

BACKGROUND

Ferric Chloride has virtually replaced nitric acid and dutch mordant as an etchant for copper. From the 1990's, when Keith Howard introduced printmakers to etching in vertical tanks of ferric to Friedhard Kiekeben's discovery of the Edinburgh Etch (© F.K. 1997) ferric chloride is now recognised as the best as well as the safest etchant for copper and brass plate.

Ferric chloride, sometimes referred to as iron perchloride, is not in fact an acid but a corrosive salt. Brown in colour, the solution will darken with use, turning muddier over time, eventually appearing greenish black once exhausted.

Care should be taken to avoid contact with skin and eyes, protective clothing and goggles should be worn when mixing and decanting ferric or when etching plates.

USING FERRIC CHLORIDE

Our Ferric Chloride solution comes ready mixed in a near saturated 40% strength. This equates to the alternative measurement of specific gravity 42 to 45 baume. Baume is measured using a hydrometer. A standard strength for a careful etch on copper is 42 baume, above this and the ferric will etch more slowly as the solution is viscous. We therefore recommend you check the strength of you solution and if necessary gradually dilute with water until you reach a strength of 42 baume. You can increase the dilution which will speed up the etching time, with the fastest etch being achieved at about 35 baume (this will be at a ratio of 1:1 ferric to water). Further dilution will slow the etch. Be aware though that this is guidance only, the room temperature and age of the solution will affect the speed at which the ferric etches, best practice would be to test etching times for each new platemaking project.

As the ferric chlorides corrodes the metal a sediment is produced. This sediment will settle in the lines and impede the etching process, therefore plates should either be etched face down or in a vertical etching tank.

You can test the condition of your ferric by dipping a piece of paper into it and observing the colour;

AMBER YELLOW	**=**	**FRESH**
GREEN	**=**	**OLDER BUT GOOD TO ETCH**
BLACK	**=**	**EXHAUSTED AND READY TO REPLACE**

EDINBURGH ETCH (© F.K. 1997)

Edinburgh Etch is a mixture of 4/5 ferric chloride solution and 1/5 citric acid solution. It will improve the etching potential of ferric as well as dissolving the sediment and it will etch with the utmost precision. Its great advantage over straight ferric is that it can be used in flat trays with the plate face up, as well as vertical tanks. Mix up 5 litres of Edinburgh Etch as follows;

1 LITRE CITRIC ACID SOLUTION (250g citric acid powder dissolved in 750ml warm water)

GRADUALLY added to

4 LITRE FERRIC CHLORIDE SOLUTION 40%

The solution will remain active for a long time, a few years possibly. It can be stored in strong plastic containers and when left in the trays is best covered to avoid evaporation. Before etching, feed the solution a small scrap of copper and this will give it a kick start.

The surface of copper will tarnish after exposure to ferric chloride and so will require de-oxidising if further acrylic resists are to be applied. A solution of salt and white vinegar (2/3 tbsp salt per litre white vinegar) can be mixed up with which to bathe the plate.

WARNING - DO NOT MIX METALS Different metals should not be etched in the same batch of ferric solution.

WARNING – ZINC is not now considered a safe metal to etch in ferric chloride due to harmful gases produced. Use appropriate extraction/ventilation. Full strength ferric can start an uncontrolled reaction on contact with large areas of exposed zinc.

HEALTH AND SAFETY

Ensure appropriate protective clothing is worn to avoid contact with skin and eyes, a dust mask is recommended as citric acid powder can irritate if inhaled. Spillages can be mopped up with a mixture of soda crystals and water, which will neutralise the ferric chloride.

NEUTRALISATION AND DISPOSAL

The safest way to dispose of exhausted etching solutions is to take them to a chemical disposal company. Ferric chloride or Edinburgh Etch can be neutralised by adding soda crystals. Your local authority may then allow disposal down the drain if the neutralised solution is highly diluted. Please check. To neutralize an Edinburgh Etch or ferric chloride solution, gradually add a strong sodium carbonate solution to it (1:1 soda crystals to water). It will fizz then settle. Once settled add more sodium carbonate solution until no further fizzing occurs. Neutralisation is then complete.

FURTHER READING AND RESOURCES

Non-Toxic Printmaking by Mark Graver / A&C Black

ISBN 9781408113257

Intaglio The Complete Safety-First System For Creative Printmaking By Robert Adam and Carol Robertson / hames and Hudson

ISBN 9780500286616

www.nontoxicprint.com

www.jacksonsart.com/blog/2016/05/06/environmental-ethics-printmaking-studio