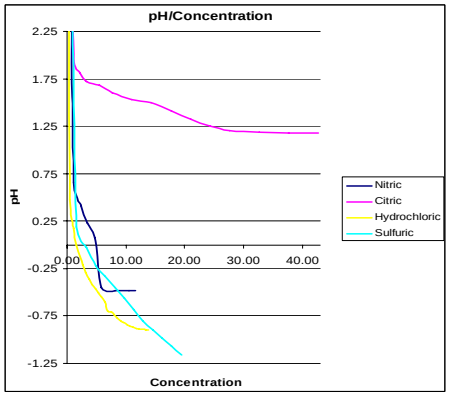
Blayson

Best Practice for Leaching of Blayson Soluble Wax Products

1. Type of Acid to Use



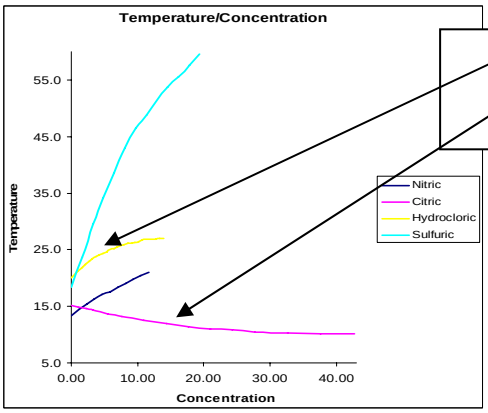
Tests were carried out using four acids:

- Hydrochloric
- Sulphuric
- Nitric
- Citric (Powder)

It was found that exceeding the concentration of a 10% solution gave no significant improvement in leaching performance

A 10% solution of Hydrochloric Acid is the most effective.

2. Reactions that take place when making up acid solutions



Exothermic Reactions.
Endothermic Reaction.

On adding the acids to the water, in addition to the pH falling significantly, the temperature increased with Hydrochloric, Nitric and especially Sulphuric acids - the amount of temperature increase depending on the concentration of the acid.

When Citric acid powders were added, the temperature decreased as the heat of the solution was used to dissolve the powders.

Caution - If patterns are immersed when the acid is too hot, softening of the wax could take place with resultant pattern distortion.
If patterns are immersed when the acid is too cold, ie Citric acid, then cracking of the patterns could take place. Checking of the acid temperature is essential prior to leaching.

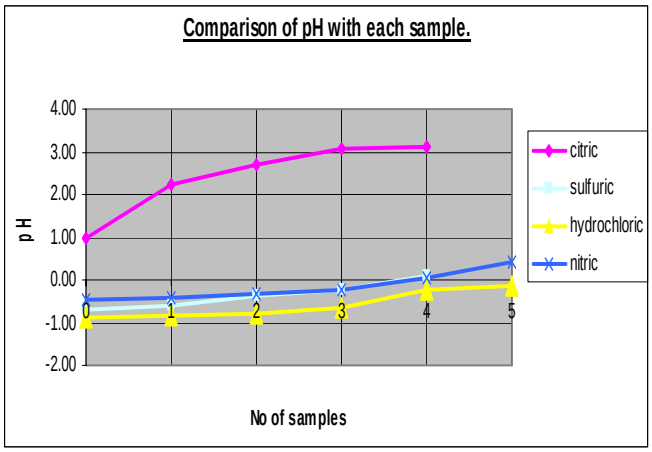
After making up the acid solution, the temperature should be checked prior to leaching

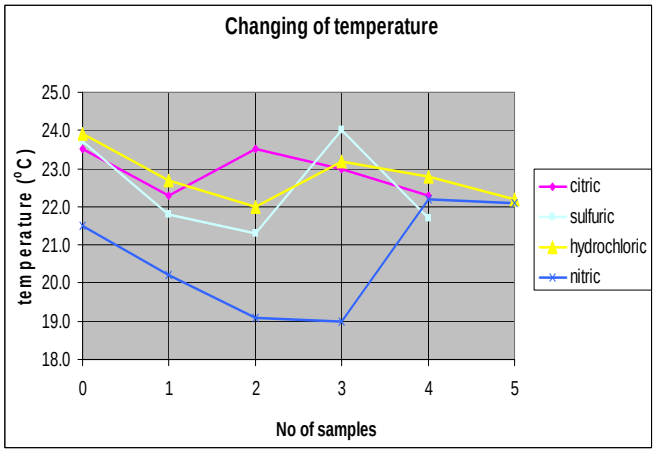
3. Leaching temperature

- Experiments proved that the leaching process itself relies on temperature for the reaction, which is endothermic
- In trials, samples at 31°C took around 45 minutes to dissolve, whereas samples at 18°C took 110 minutes
- One other observed effect was that the foaming was much reduced at lower temperatures.

<u>The Leaching Bath should be temperature controlled, and maintained at 23 – 25°C</u>

4. pH Control





Experiments showed that with repeated additions of wax to the acid solution, the pH of the solution increases and the temperature decreases.
The net result of these changes is that the leaching time increases as the acid solution weakens.
It follows therefore that there is a risk that as patterns are added to the leaching tank, the soluble wax may not be completely removed.

It is recommended in addition to the temperature, the pH of the solution be constantly monitored :

a. **To dictate how much time each pattern should have for complete soluble core removal**
b. **To dictate when the acid bath should be refreshed with new acid solution or whether it should be completely renewed**
c. **Agitation of the acid bath is recommended to ensure leaching of difficult areas of the pattern, e.g blind holes.**

<u>Testing indicated that the pH should be maintained between – 0.84 to – 0.9 for most effective leaching.</u>
An electronic pH meter was used in tests carried out by Blayson. Using other pH meters could give different results. pH meters should be calibrated using pH 7 & pH 4 buffer solutions.

Blayson Olefines Ltd
Denny Industrial Centre, Pembroke Avenue, Waterbeach, Cambridge CB25 9QP, UK
Tel +44 (0)1223 861491 Fax +44 (0)1223 441500
Email: enquires@blayson.com www.blayson.com