

## **Hypo Batch Time Reduction by Electrodeless Conductivity System**

### **INTRODUCTION**

Hypo preparation basically involves chlorine addition to caustic solution. This is done in numerous steps or ways depending on the grade / quality of product required or the process implications of the manufacturer. We have compiled this data on a generalized method of hypo preparation by a number of manufacturers. It may also be relevant to your process or may need slight alterations.

Initially, in most industries chlorine addition to caustic was done in 2-3 steps and the resultant product was checked by frequently taking samples to and fro the laboratory or by general experience of the operator. This procedure was not only time consuming and tedious but it also had inherent errors due to human intervention. After doing frequent trials, it was concluded that by using “ GLI ELECTRODELESS CONDUCTIVITY SYSTEM “ in this process; **Chlorine could be added directly in steps** as per the desired quantity and the conductivity was observed. There were considerable savings by way of batch time reduction and improvement in quality due to no human intervention. In some cases it was found that by doing chlorine addition in one step the batch time which usually used to take 5-6 hrs was reduced to 3 1/2-4hrs thus increasing the number of batches per day.

## **GLI Electrodeless Conductivity Systems in operation**

We have briefly tried to illustrate the method followed while manufacturing hypo with GLI Electrodeless Conductivity Systems in operation. All values mentioned here are as per that observed at site, during the trials and may or may not coincide with the values being used by various manufacturers. However, the repeatability of the measurement ensures that it can be used for almost all manufacturers with slight alterations in the parameters. The process is as follows:

- Reactor is filled with 30-32% caustic solution, which is diluted by adding water (Normally 11% -13 %). At this time temperature is in the range of 28 °C to 30 °C.
- The conductivity observed during this cycle is around 150 ms/cm and comes down gradually to 78 – 82 ms/cm by the time temperature reaches 5-7 °C. Hypo concentration depends on initial NaOH concentration and it is assumed that chlorine is added by weight / volume to the reactor depending on the standard formulae and your corresponding batchsize.
- During the process coolant is circulated as it is an exothermic reaction and the temperature is brought down. When the temperature is in the range of 5-7 °C. Chlorine is added in one step as per the calculated weight / volume.
- This addition causes a spurt in temperature (approx 15 °C to 16 °C) and conductivity (approx – 110 ms/ 120ms /cm). However, as the process cools down the conductivity comes down to 40 –45 ms/cm along with temperature (.5 °C). This indicates the end –point of the reaction and hypo batch is ready.

Thus by observing the conductivity and temperature of the system online, the endpoint of the reaction can be forecast and also the results observed. The above method eliminates the 2-3-step chlorine addition procedure wherein there is a loss of batch time.

### **Note:**

Sometimes, the process or the operator may demand that in the 1<sup>st</sup> step approx 96-98% of the calculated value of chlorine be added and the balance be added in fine tune with the process. This is just a precautionary step and need not be complied with after the repeatability of the system is established.