

# Lessons in Nusol

## Product Evolution and Performance

CS NUSOL EVOLUTION

June 9, 2007

## The Future of Nusol

Since the inception of the NUSOL technology our research and development team has worked on formulating a heavy duty product that will work on the most demanding aluminum applications. As we all know this has been a difficult undertaking. In the course of the last year and a half Chemtool has brought a number of products to the market. The results have been a mixed bag of successes and failure. The reasons for the inconsistencies have run the gamut; poor tool life, galling, residues, excessive concentrations, over sized taps, etc. The frustrating aspect has been that one customer may be pleased with the performance, whereas a new customer running a similar application encounters problems.

If we look at the NUSOL chemistry, the product that was arguably the most consistent performer in the field was the NUSOL 21 ULTRA MAX. This product contained PAO with chlorine and sulfur. Unfortunately, ULTRA MAX was limited on micro tapping and micro finishes as well as deep hole drilling or tapping. Even when concentrations were double or tripled there was no improvement seen and in some cases the oily residues left behind were an issue. If we look at the chemistry of the Ultra or HP for that matter there is roughly 0.5% of the PAO in a 10% dilution. So even if the concentration or the amount of PAO in the finished product is doubled the level of PAO increases by only 0.5%. This small amount does show us how effective the PAO actually is but it appears that a higher level of boundary lubrication is necessary to perform these more extreme applications.

This is how we arrived at the NUSOL 21 ULTRA HO. It contained the same amount of PAO and chlorine as the ULTRA MAX, but we added an additional 20% 100SUS naphthenic oil. This has worked extremely well. We have been able to meet finishes and tapping requirements with a much higher success rate. This is the product I would look to rather than the NUSOL EP, EPX, A-Z, or ULTRA MAX. Consolidation of the NUSO line is still a priority.

This is not to say that the ULTRA HO is the end all for the NUSOL line. This product will not run as clean on cast iron as a synthetic or the NUSOL SUPREME or the NUSOL HP. Several customers have had issues with fines and perceived buildup. For this reason we have introduced the NUSOL MO (half of the oil as the HO).

Many of our customers are running multiple alloys in their facility. At the same time they are looking for one product to run. Time and time again we are chasing our tails in an attempt to satisfy customers. From my conversations with the sales force it appears that the customers are quick to forget the added benefits and improvements we have provided them with. Lets not forget to use our Field Trial Reports to remind the customer with hard facts just what we have done for them. We are in an age of ISO 9000, QS9001, and Six Sigma. Use the FTR as a tool to benefit both you and the customer.

Along the side of this report you will find a list of pertinent questions to ask yourself when you encounter a problem with the NUSOL chemistry. Challenge your customer to help himself as well by improving his process. A perfect example is a customer running NUSOL HO on cast iron and using a 50 micron filter. Residues were building. The product was dirty. The customer never thought of reducing the filter bag size. IT WAS THE PRODUCT THAT WAS THE PROBLEM. Investigate the system you are in.

In the coming weeks I will be sending out more reports like this that will include many of your own accounts. We must find out just what is happening in the field. Who is having success and where are there problems or limitations with the chemistry? How have problems been solved? What is the consensus in the field on the performance of the NUSOL chemistry?

Next month I will also be sending out an updated Power Point presentation on Nusol.

Please contact me if you have any particular items you would like included.

### NUSOL Product Applications

#### NUSOL 21 SUPREME

- Cast Iron

#### NUSOL 21 HP

- Cast Iron
- Steel
- Stainless

#### NUSOL 21 MO

- Cast Iron
- Steel
- Aluminum
- Stainless (exotics)

#### NUSOL 21 HO

- Steel
- Aluminum
- Stainless (exotics)

#### NUSOL 21ULTRA MA

- Steel
- Aluminum (limited on micro tapping and high finish reaming and boring applications)

### Investigate Document

- What are my customers expectations? List them. Log them. Document them before the trial begins.
- Document every positive during the trial. Present them to your customer. Many unexpected improvement occur, but get lost when a problem surfaces.
- List the specifics of the machine center you are in.
- Suggest improvements to the system to your customer. Document those suggestions.
- Know the filtration
  - Paper media, Chain drag out
  - Cartridge, Skimmer, etc.