CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	1995
DateRun:	08/22/1995
Experimenters:	Donald Garlotta, Jay Jankauskas
ClientType:	Stamping Company
ProjectNumber:	Project #1
Substrates:	Copper
PartType:	Part
Contaminants:	Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil
Cleaning Methods:	Ultrasonics
Analytical Methods:	Wipe
Purpose:	A scale-up feasibility test

Experimental Procedure:

This is a scale-up feasibility test to determine if Stamping Company's parts can be cleaned effectively in large, dumped batches, or if it is necessary to place all the rods pointing hole side up.
Cleaning was performed with a five percent solution of Oakite Inproclean #3800. A couple of handfuls of copper tubes was placed in a stainless-steel basket (approximately 300 tubes per batch). Cleaning took place for 15 minutes at 120 F (when the basket is lowered into the cleaner bath, it was shaken for 30 seconds to allow the cleaner solution enters the tubes). After cleaning the basket was shaken above the cleaner tank to remove as much cleaning solution as possible. Rinsing was performed in a tap water bath set at 120 F for 5 minutes (once again the basket was shaken during and after rinsing). Due to the amount of tubes being cleaned, the tubes were dried in a large beaker in a convection oven with the temperature increased to 350 F for 30 minutes. Previous trials had a drying temperature of 160 F for 30 minutes. With this higher temperature, any residual oil in the tubes ran out and dripped on the bottom of the beaker during drying thus giving us a quick visual test.
The second batch of parts was run under the same parameters as the first batch except that the cleaning time was increased to 30 minutes.
The third batch had all the tubes arranged in one direction with the hole side pointing up at a 5-degree angle. A longer cleaning time was used (25 minutes) due to the cleaning bath being very contaminated. All other parameters will be the same.
After drying is complete, the parts were inspected for cleanliness by looking for any oil that drained out on the bottom of the drying beakers. If the tubes passed this preliminary test, they were then checked with a cotton swab.

CLEANING CONDITIONS:

Temperature

	time (min)	trial #1	trial #2	trial #3
Crest Ultrasonics	15	118		
Crest Ultrasonics	30		136	
Crest Ultrasonics	25			140
#1 RINSE/TAP H_2O	5	118	116	122
DRY convection oven	30	320	370	324

Results:

Trial #1 - Cleaning was ineffective at fifteen minutes. During drying, a lot of oil dripped out of the tubes.
Trial #2 - Cleaner than trial #1 but there was still quite a bit of oil
Trial #3 - Tubes appeared very clean on the insides (no oil was noticed on the bottom of the beaker) and the cotton swabs showed that the tubes were quite clean. This was by far the best cleaning method despite the tubes being cleaned in a very contaminated cleaner bath.

Summary:

Substrates:	Copper				
Contaminants:	Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Oakite Products	Inproclean 3800	5	0.00	☐	

Conclusion:

The spacial arrangement of the tubes appears necessary at this point. Random placement of the tubes might be accomplished if the basket as hooked up to a shaker to agitate the parts. We are currently sourcing out information on this idea from various vendors.