CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1995

DateRun: 07/04/1995

Experimenters: Donald Garlotta, Jay Jankauskas

ClientType: Electro-Optical Devices

ProjectNumber: Project #1

Substrates: Glass/Quartz

PartType: Part

Contaminants: Waxes

Cleaning Methods: Ultrasonics

Analytical Methods: Gravimetric

Purpose: Find cleaners for removal of the wax

Experimental Procedure: The purpose of this trial is to get some cleaners that would be appropriate for Electro-Optical Devices' needs.
Two different cleaners will be used. Since we really don't know how much time will be needed for removal of the wax, we will check the glass parts at 5 minute intervals and remove the part from the cleaning bath when we deem appropriate. The two cleaners are the Oakite Inproclean #3800 and Church & Dwight Armakleen 2002. A 15% solution of each will be used. Cleaning will be done in an ultrasonic tank at 150 F, rinsing will be done at the same temperature in tap water for two minutes. The parts will be dried under air knives for two minutes and then placed in a convection oven set at 190 F for 20 minutes. The parts will then be cooled down for one hour and then analyzed gravimetrically.
After the first two trial were ran we decided to do a third in which the Oakite Inproclean #3800 was used at a 5% concentration.

Results: The Oakite Inproclean #3800 performed the best with outstanding wax removal after just 5 minutes. The one problem which might not be major is that the wax dissolves in the cleaner solution so that removal of wax from the cleaner bath can't be accomplished. When using the 5% solution of Inproclean #3800 the wax was easily separated from the cleaning solution, a slightly longer cleaning time was necessary and there seemed to be some kind of cloudiness on the glass.
The Armakleen 2002 was the least successful. Quite a bit of wax residue remained on the glass parts, and it seems some of the wax dissolved into the cleaning solution. The greater than 100% removal obtained was due to some coating that the Armakleen removed which was on the part prior to weighing.

GRAVIMENTRIC ANALYSIS

sample #	clean mass (g)	mass with contamination (g)	mass after cleaning (g)	contaminant removed (g)	Percent removal
#1	18.5032	19.9066	18.5034	1.4032	99.99%
#2	18.7390	19.9260	18.7318	1.1942	100.61%
#3	18.5032	20.1649	18.5033	1.6616	99.99%

Summary:

Substrates:	Glass/Quartz				
Contaminants:	Waxes				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Oakite Products	Inproclean 3800	15	99.99	☑	
Oakite Products	Inproclean 3800	5	99.99	☑	
Church & Dwight Co Inc.	Armakleen E 2002	15	100.60	☐	

Conclusion: The Oakite #3800 looks excellent at both concentrations. May want to leave the 5% solution in for 15 minutes instead of 10 and use a DI water rinse to avoid spotting. Although the Armakleen showed good removal this is due to the amount of coating that the Armakleen had removed. A slight amount of wax residue was noticed on the glass.