CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1996

DateRun: 05/16/1996

Experimenters: Jay Jankauskas

ClientType: Aircraft Parts Manufacturer

ProjectNumber: Project #1

Substrates: Aluminum

PartType: Part

Contaminants: Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil

Cleaning Methods: Immersion/Soak

Analytical Methods: Visual

Purpose: Find cleaning system to replace Mineral Spirits

Experimental Procedure: The purpose of this experiment is to find an aqueous cleaning system for Aircraft Parts Manufacturer that will replace their current Mineral Spirits usage. For this system to be successful it must accomplish four things:

1) Must be effective in removing lapping oils from parts.
2) Must be free rinsing and leave no residue.
3) Preferably be operated at a lower temperature (around 120 F).
4) Must be Multi-Metal safe.

For the first part of the trial, 7 different chemistries were tested against a sample of Hubbard-Hall Ram Charger and Chemstation GreenStuff. Chemistries were selected on the four cleaning chemistry goals listed above. The concentrations of each chemistry were at recommended usage concentration for heavy cleaning supplied by the vendors. All cleaning was performed in a 2-liter beaker with stir-bar agitation. Cleaning time was 10 minutes, and the cleaning temperature was 120 F (both the Ram Charger and Green Stuff II were cleaned at 150 F). After cleaning, each part was rinsed for 20 seconds in room temperature tap-water. The parts were then dried in a convection oven for one hour.
SUBSTRATE MATERIAL: 3"x 6" Aluminum Plates
CONTAMINANTS: Speedfam #210 Oil-Based Vehicle
CONTAMINATING PROCESS USED: Applied on with handheld polishing unit.

Results:

Company	Tradename	Concentration	Results
Oakite Products Inc.	Inproclean 1300	13%	Good
Mirachem Corporation	Mirachem 500	5%	Poor
Brulin Corp.	815 GD	10%	Excellent (see microcam photo)
Gemteck Corp.	Safe Aircraft	5%	Good, but some etching was noticed
General Chemical Corp.	Aluminex 5761	10%	Poor
Delta Omega Technologies	DOT 111/113	10%	Poor
W.R. Grace Inc.	Daraclean 282	15%	Excellent (see microcam photo)
Hubbard Hall Inc.	Ram Charger	100%	Poor (see microcam photo)
Chemstation	Green Stuff II	10%	Poor (see microcam photo)

The second part of the trial tested out the cleaning efficiency of the two best performers in part one (the Brulin 815GD and the Daraclean 282). The concentrations used for both chemistries were from 4-10% in

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increments of 2%. All other cleaning, rinsing and drying parameters were kept constant with part one. After cleaning the panels were inspected for soil removal and rinsing efficiency. For both the Brulin 815 GD and the Daraclean 282, cleaning efficiency appeared to drop considerably when the solutions reached six percent. A microcam picture was taken of the most heavily soiled area on the panels after cleaning.

Summary:

Substrates:	Aluminum				
Contaminants:	Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Oakite Products	Inproclean 1300	13	0.00	☐	
Mirachem Corporation	Mirachem 500	5	0.00	☐	
Brulin Corporation	Formula 815 GD	10	0.00	☑	
Gemtek Products	SC Aircraft & Metal Cleaner Super Concentrate	5	0.00	☐	
General Chemical Corporation	Aluminex 5761	10	0.00	☐	
Delta Omega Technologies Ltd	DOT 111/113	10	0.00	☐	
Magnaflux	Daraclean 282 GF	15	0.00	☑	
Hubbard Hall Inc	Ram Charger	100	0.00	☐	
Chemstation International	Greenstuff II	10	0.00	☐	

Conclusion:

For removal of the #210 Oil Base Vehicle, it appears that both the Daraclean 282 and the Brulin would be appropriate. Both chemistries have their advantages: The Brulin 815GD has gained approval from several aircraft manufacturers including McDonnell Douglas, Boeing, Lockheed and Northrop for meeting quality specifications. From past trials at the Surface Cleaning Lab, the Daraclean 282 has always performed well in the areas of soil removal, multi-metal compatibility and rinsibility.
It appears to me that both of these chemistries could be successfully implemented. For successful rinsing to take place I believe that Aircraft Parts Manufacturer would need to employ a two-stage rinsing technique. The temperature of the rinse should be on the cool side (below 120) since hot rinsing can cause water staining if the rinse-water is of poor cleanliness. The Daraclean 282 can also be used in conjunction with the Daraguard 416 Rinse Aid which has worked excellent in the lab for increasing rinsing efficiency.