CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	1997
DateRun:	07/02/1997
Experimenters:	Andrew Bray
ClientType:	Aluminum Anodizing Job Shop
ProjectNumber:	Project #1
Substrates:	Aluminum
PartType:	Coupon
Contaminants:	Waxes
Cleaning Methods:	Vapor Degreasing
Analytical Methods:	Gravimetric, Visual
Purpose:	Evaluate using aqueous cleaner as 1st rinse

Experimental Procedure:

This experiment was designed to explore the possible advantages of using an aqueous cleaner or wax stripper in the first rinse bath. The wax removal performed by the cleaning solutions may allow for much lower rinse temperatures and subsequently, significant energy and water cost savings. The wax strippers were tested at two concentrations to remain consistent with earlier tests. The cleaning procedure used was as follows: 212 F steam cleaning for fifteen minutes; 150 F agitated immersion wash for fifteen minutes; 150 F agitated tap water rinse for ten minutes; 150 F second agitated tap water rinse for five minutes. The six cleaning solutions tested are:
50% Super Blue Non-Ammoniated Stripper
100% Super Blue Non-Ammoniated Stripper
50% Zap Stripper
100% Zap Stripper
10% Inproclean #3800
2% Alconox Alcojet
When the cleaning procedures were completed, the coupons were placed in an oven at 120 F for thirty minutes to speed the drying process. The coupons were allowed to return to ambient temperature overnight before further inspection.

SUBSTRATE MATERIAL: Aluminum 5052 Coupons
CONTAMINANTS: Mobilewax 2305
CONTAMINATING PROCESS USED: Coupons contaminated at Aluminum Anodizing Job Shop by dipping into vat of masking wax and allowing wax to cure

Results:

Similar to earlier tests, the steam was effective at leaving the bulk of the wax. In this trial the steam was stationary and was continually contacting the coupons in one area. In this area the wax appeared to be completely removed. The cleaning solutions performed additional removal but did not completely remove the visible wax. The Super Blue Non-Ammoniated Stripper and the Zap Stripper appeared to etch the coupons. No wax appeared to be removed in either rinse bath for any of the test coupons.

Gravimetric Analysis	Mass Initial	Mass Cont.	After Cleaning	Percent Removed
50% Super Blue	21.4245	25.3131	21.6810	93.40
100% Super Blue	21.5535	24.7147	21.8019	92.14
50% Zap	21.4079	24.7543	21.7640	89.36
100% Zap	21.3784	24.3804	21.7537	87.50
2% Alcojet	21.5248	24.8413	21.7211	94.08
10% Inproclean	21.5810	25.0603	21.8087	93.46

Summary:

Substrates:	Aluminum				
Contaminants:	Waxes				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Water	Steam	100	0.00	☐	
Oakite Products	Inproclean 3800	10	0.00	☐	
Alconox Inc	Alcojet	2	0.00	☐	
Don Garland Inc	Zap Ammoniated Stripper	100	0.00	☐	
Don Garland Inc	Zap Ammoniated Stripper	50	0.00	☐	
Don Garland Inc	Super Blue Non Ammoniated Stripper	100	0.00		

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Don Garland Inc	Super Blue Non Ammoniated Stripper	50	0.00	☐	

Conclusion:

From visual observations made on the coupons cleaned in Super Blue Non- Ammoniated Stripper and Zap Stripper, it appeared that these cleaners etched the aluminum test coupons under the conditions of this experiment. Alconox Alcojet and Inproclean 3800 performed similarly. None of the test solutions were effective at removing the visible wax that remained after steam cleaning. Contact Angle Goniometry and Optical Sensor Electron Emission were not viable evaluation options for this trial, as the surfaces all coupons remained thoroughly contaminated at the end of the cleaning trial. It should be noted that, due to the difference in lab steaming procedures and those proposed for Aluminum Anodizing Job Shop's new cleaning system, it is difficult to evaluate the effectiveness of these cleaners at removing trace amounts of wax. In the lab trials to date, a visible layer of wax has remained on the coupons after the steam-cleaning step. However, in the initial steam cleaning trial performed at Aluminum Anodizing Job Shop, all visible wax was removed. Because this was not the case with lab trials performed at the Surface Cleaning Lab, conclusions may not be drawn as to the effectiveness of Alcojet and Inproclean at removing trace amounts of wax. The initial test bars cleaned at Aluminum Anodizing Job Shop will be cleaned in these two aqueous cleaners at various temperatures to further explore their ability to trace wax residue.