CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1995

DateRun: 06/05/1995

Experimenters: Donald Garlotta, Jay Jankauskas

ClientType: Plating Job Shop

ProjectNumber: Project #1

Substrates: Aluminum, Brass, Copper, Steel

PartType: Coupon

Contaminants: Waxes

Cleaning Methods: Mechanical Agitation

Analytical Methods: Gravimetric

Purpose: Test effectiveness of ND -17 in removing wax

Experimental Procedure: There were two goals for this trial, first, to test the effectiveness of MacDermid ND-17 for Plating Job Shop's needs. The second was to determine to most effective way to reduce wax drag out from the cleaning bath. For each substrate three different methods of removing the coupons from the cleaner bath was used. The first method (removal #1) was to quickly remove the coupons while the air sparging was still activated. The second method (removal #2) was to turn off the air sparging and then quickly remove the coupons. The final method (removal #3) was to keep the coupons in the solution after cleaning and allowing the solution to cool until the wax solidified and could easily be skimmed off the top.
Parts were weighed before and after contamination. Cleaning in the air sparged beaker would last for 20 minutes at 160 F. Rinsing was performed for 5 minutes in a tap water bath at 160 F. The coupons were then dried under air knives for two minutes and then placed in a convection oven set at 120 F for 90 minutes. The coupons were then allowed to cool for 2 hours and weighed once again.
To minimize the time of the trial, all 24 coupons were cleaned in a total of eight beakers. 3 coupons of the same material were used in each beaker. In each beaker 2 coupons were removed with either method #1 or #2 while the third coupons was removed with method #3.

Results: SURFACE CLEANING LAB

GRAVIMENTRIC ANALYSIS

sample # and substrate	removal method	clean mass (g)	mass with contamination (g)	mass after cleaning (g)	contaminant removed (g)	Percent Removal
61 - Steel	1	188.5192	190.6576	188.5282	2.1294	99.58%
65 - Steel	1	221.6276	223.9264	221.6356	2.2908	99.65%
16 - Steel	2	172.9255	174.9124	172.9260	1.9864	99.97%
28 - Steel	2	146.6684	148.3150	146.6696	1.6454	99.93%
1 - Steel	3	166.8401	168.4727	166.8416	1.6311	99.91%
5 - Steel	3	186.0529	188.1641	186.0515	2.1126	100.07%
16 - Al	1	21.0087	22.3233	21.0143	1.309	99.57%
17 - Al	1	21.0274	22.3866	21.0320	1.3546	99.66%
13 - Al	2	20.9922	22.4662	21.0001	1.4661	99.46%
15 - Al	2	20.9727	22.5154	20.9849	1.5305	99.21%
14 - Al	3	21.0111	22.4593	21.0181	1.4412	99.52%
18 - Al	3	21.0122	22.2181	21.0139	1.2042	99.86%
3579 Cu	1	35.3583	36.6686	35.3628	1.3058	99.66%
3988 Cu	1	35.3999	36.3755	35.4007	0.9748	99.92%
5096 Cu	2	35.5109	36.3669	35.5348	0.8321	97.21%
5581 Cu	2	35.5584	36.3573	35.5627	0.7946	99.46%
3545 Cu	3	35.3558	36.0879	35.3602	0.7277	99.40%
4076 Cu	3	35.4079	36.4492	35.4093	1.0399	99.87%
5251 Brass	1	34.5273	35.4646	34.5266	0.938	100.07%
6577 Brass	1	34.6592	35.5675	34.6580	0.9095	100.13%

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Summary:

The ND-17 did not create a lot of foam even under intense agitation. Removal was alight, just as good as the Daraclean 283 but not nearly as good as the Daraclean 294xx. The ND-17 would not be a desirable due to the intense discoloration of the brass coupons.

Substrates:	Aluminum, Brass, Copper, Steel
Contaminants:	Waxes

Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
MacDermid Industrial Products	ND 17	10	97.21	☐	

Conclusion:

Some recommendations for further trials would be to test several cleaners (Oakite 3800, Oakite 4000T, Calgon Geo-Guard 5210, and Chemtech CT-1), to find a chemistry that is compatible. Some sort of agitation should be used on the rinse tank. The temperature of the rinse and the cleaner tank must be over 140 F so that the wax melts but a slightly lower temperature of 150 might be tried to minimize the possibility of etching onto brass.