CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2002
DateRun:	08/06/2002
Experimenters:	Jason Marshall
ClientType:	Metal
ProjectNumber:	Project #1
Substrates:	Copper
PartType:	Coupon
Contaminants:	Buffing/Polishing Compounds
Cleaning Methods:	Ultrasonics
Analytical Methods:	Gravimetric
Purpose:	To evaluate successful cleaners under client conditions
Experimental Procedure:	Two products that were successful in the previous trial without wiping were selected for continued evaluation. The two solution was diluted to 1% using DI water in 600 ml beakers, heated to 130 F and degassed for 10 minutes in a Crest 40 kHz ultrasonic tank. In addition to the two successful cleaners, two other products were selected for further evolution. These products were used at the original 5% dilution and were heated as well as degassed as the first two products. Twelve preweighed coupons were coated with Jackson Lea Learok 7-S-3 Buffing compound (102-71-6, 14808-60-7, 1317-95-9). The buffing compound was applied by first heating it with a hot air gun and rubbing the coupons with the melted contaminant. Coupons were allowed to cool to room temperature and then weighed again. Three coupons were cleaned in the 1% solution for 1 minute using ultrasonic energy at 40 kHz and the 5% solutions cleaning lasted for 5 minutes. Following the cleaning, coupons were rinsed with a DI water bath for 30 seconds at room temperature and dried using a Master Appliance Heat Gun at 300 F for 15 seconds. Coupons were again allowed to cool to room temperature and then weighed a final time. Cleaning efficiencies were calculated and recorded.
Results:	The products used at 1% removed only a small amount (<30%) of the buffing compound from the coupons after 1 minute. Therefore, an additional 4 minutes was added to the cleaning time with vastly improved results. The products removed over 99% of the contaminant. Results for the 1% cleaning are listed in Table 1.

Table 1. 1% Cleaning Results

Cleaner	Coupon 1	Coupon 2	Coupon 3	Average	Std Dev	1 minute
Permag S-4	100.07	98.55	99.96	99.53	0.85	27.79
Micro 90	100.00	100.06	100.00	100.02	0.04	11.30

The 5% solutions also did not remove a majority of the buffing compound after the initial 10 minutes of cleaning. An additional cleaning time of 5 minutes (total of 15) was added. Results were comparable to the 1%, 5 minute cleaning requiring no wiping. Both products removed over 95%

Table 2. 5% Cleaning Results

Inproclean 3800	100.18	100.10	100.07	100.12	0.06
Daraclean 282 GF	98.92	94.07	98.63	97.21	2.72

Summary:

Substrates:	Copper				
Contaminants:	Buffing/Polishing Compounds				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Magnuson Products	Permag S-4	1	99.53	☑	5 minutes
International Products Corporation	Micro 90 Conc.	1	100.02	☑	5 minutes
Oakite Products	Inproclean 3800	5	100.12	☑	15 minutes
Magnaflux	Daraclean 282 GF	5	97.21	☑	15 minutes

Conclusion: The next phase of testing will be to clean actual parts when supplied by client.