CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1999

DateRun: 11/02/1999

Experimenters: Jason Marshall

ClientType: Bellows Mfr

ProjectNumber: Project #1

Substrates: Brass

PartType: Coupon

Contaminants: Fluxes, Resins/Rosins

Cleaning Methods: Ultrasonics

Analytical Methods: Gravimetric

Purpose: To further evaluate cleaners using ultrasonic energy in conjunction with effective cleaners.

Experimental Procedure: Four products were selected based on the previous testing performed for the client. All four cleaners were diluted to 5% using DI water in 400 ml glass beakers. Two were also made into a 10 and 100% solution. All products were heated to 130 F on a hot plate. Table 1 lists the products evaluated and the corresponding concentrations.

Eighteen preweighed coupons were coated with the flux and heated to 100 F for one hour in an oven. After cooling to room temperature, a second weighing was performed to determine the amount of contamination present on each coupon. The cleaning solution was placed in a Crest 40 kHz ultrasonic tank model 4Ht 1014-6 filled with water heated to 130 F and degassed for five minutes. Three coupons were placed into the suspended beaker and cleaned for five minutes. Coupons were rinsed in DI water at 130 F for 30 seconds and dried using a Master Appliance Corp, Hot-air gun model HG-301A at 500 F for 30 seconds. Once the coupons returned to room temperature, final clean weights were recorded and cleaning efficiencies were calculated.

SUBSTRATE MATERIAL: Brass Coupons 260
CONTAMINANTS: Kester Solder 1544 Rosin Flux-(Ethanol CAS#64-17-5;2-Butanol CAS#78-92-2*;Modified Rosin CAS#8050-09-7)
CONTAMINATING PROCESS USED: Coupons coated using hand-held swab and then dried in an oven at 100 F for one hour.

Results: The use of ultrasonic energy greatly increased the efficiencies of all the solutions tested. Only one solution, Bio-T at 5% dilution had an efficiency lower than 95%. Table 2 lists the results for each cleaner and concentration.

Table 2. Cleaning Effectiveness

	Armakleen	Safey Wash 5	SW 10	Bio-T 5	Bio-T 100	Inproclean
Coupon 1	100.06	97.58	99.85	71.97	100.09	100.27
Coupon 2	100.00	91.38	100.00	44.69	100.00	95.61
Coupon 3	99.76	96.47	99.61	18.37	100.22	99.78
Average	99.94	95.14	99.82	45.01	100.10	98.55

Summary:

Substrates:	Brass				
Contaminants:	Fluxes, Resins/Rosins				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Church & Dwight Co Inc.	Armakleen E 2002	5	99.94	☑	
Emkay Chemical Company	Safety Wash CRC	5	95.14	☑	
Emkay Chemical Company	Safety Wash CRC	10	99.82	☑	
Bio Chem Systems	Bio T 300 B	5	45.01	☐	
Bio Chem Systems	Bio T 300 B	100	100.10	☑	
Oakite Products	Inproclean 4000 T	5	98.55	☑	

Conclusion: All of the products tested were very effective in removing nearly all of the flux from the coupons. The increased concentrations for Safety Wash CRC and Bio-T 300 B proved to be as effective as the Armakleen and Inproclean 4000 T at 5%. These four solutions will be used to clean the supplied client parts.