# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1999

DateRun: 10/28/1999

Experimenters: Jason Marshall

ClientType: Bellows Mfr

ProjectNumber: Project #1

Substrates: Brass

PartType: Coupon

Contaminants: Fluxes, Resins/Rosins

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric

Purpose: To identify cleaning alternative to replace TCE and methylene chloride. Cleaners should be usable in ultrasonic equipment.

Experimental Procedure: Seven cleaning chemistries were selected based on vendor supplied information and searching the lab's Effective Test Conditions Database. The cleaners were diluted to 5% by volume in 400 mL glass beakers and then heated to 130 F on a hot plate. The chemistries used are listed in Table 1.

Twenty-one preweighed brass coupons were coated with the flux and placed into an oven and dried for on hour at 100oF. After cooling to room temperature coupons were weighed again. Three coupons were cleaned for 5 minutes in a beaker using stir bar agitation. 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 one minute. After the coupons cooled to room temperature, a final clean weight was 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: At the concentration used, only one product, Armakleen 2002, was moderately successful in removing the flux from the coupons. Only one other aqueous product, Safety Wash CRC, was partially capable of removing the flux. The two semi-aqueous cleaners, Bio T 300B and Inproclean 4000 T, despite having low efficiencies, appeared to have some effect on the flux. Table 2 lists the efficiencies of all seven cleaners.

Table 2. Cleaning Results

| Product | Armakleen | SC 1000 | Safety Wash | Luminox | Dirtex | Bio-T 300B | 4000 T |
|---|---|---|---|---|---|---|---|
| Coupon 1 | 63.56 | 15.4 | 32.47 | 0.35 | 16.35 | 2.95 | -11.24 |
| Coupon 2 | 82.34 | 3.69 | 31.82 | 5.77 | 14.99 | 6.75 | 23.44 |
| Coupon 3 | 92.81 | 18.24 | 39.99 | 7.94 | 74.65 | 6.73 | -12.51 |
| Average | 79.57 | 12.44 | 34.76 | 4.69 | 35.33 | 5.48 | -0.1 |

Summary:

| **Substrates:** | Brass | | | | |
|---|---|---|---|---|---|
| **Contaminants:** | Fluxes, Resins/Rosins | | | | |
| **Company Name:** | **Product Name:** | **Conc.:** | **Efficiency:** | **Effective:** | **Observations:** |
| Church & Dwight Co Inc. | Armakleen E 2002 | 5 | 79.57 | ☑ | |
| Gemtek Products | SC 1000 Aqueous Cleaner Concentrate | 5 | 12.44 | ☐ | |
| Emkay Chemical Company | Safety Wash CRC | 5 | 34.76 | ☐ | |
| Alconox Inc | Luminox | 5 | 4.69 | ☐ | |
| Savogran Company | Dirtex Prepaint Cleaner | 5 | 35.33 | ☐ | |
| Bio Chem Systems | Bio T 300 B | 5 | 5.48 | ☐ | |
| Oakite Products | Inproclean 4000 T | 5 | -0.10 | ☐ | |

Conclusion: From the data obtained, Armakleen 2002 will be evaluated using ultrasonic cleaning as well as the Safety Wash. Bio-T 300 B and Inproclean 4000 T will be evaluated at full strength and room temperature.

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