CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2000

DateRun: 07/04/2000

Experimenters: Jason Marshall, John Brunelle

ClientType: Cleaner Manufacturer

ProjectNumber: Project #1

Substrates: Aluminum, Brass, Copper, Nickel, Stainless Steel

PartType: Coupon

Contaminants: Cutting/Tapping Fluids, Fluxes, Greases, Lubricating/Lapping Oils, Oil

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric

Purpose: To evaluate cleaning effectiveness for several contaminant types using client supplied samples.

Experimental Procedure: Table 1 lists the various coupon materials used in this evaluation

Table 1. Substrates Used

Substrate	ID#	Code
aluminum	202-7075 T-6	AL
brass	202-260	BR
Cu/Ni	202-715	CN
stainless st.	202-17-4 HR68	SS

Table 2 shows the contaminants and the associated CAS#s applied to the coupons.

Table 2. Contaminants Used

Contaminant	CAS#	Code
lubricant, 423	64742-57-0, 64742-62-7, 8052-42-4	LU
grease, KSL-111	64742-47-8	GR
oil, Citgo NC400	64741-89-5, 8052-42-4	OI
flux, Ersin 5381		FL

CONTAMINATING PROCESS USED: Coupons coated using hand held swab

Thirty-three preweighed coupons were contaminated with various contaminants based on vendor recommendations and weighed again. Cleaning chemistries were diluted to 5% using DI water in 600 ml beakers. The solutions were heated to 130 F on a hot plate. Three coupons of the same material, with the same contaminant were cleaned in the specified cleaner for 5 minutes using stir-bar agitation. Coupons were rinsed with tap water at 120 F for 30 seconds and dried at room temperature for 2 hours. Once the coupons were dry, the final clean weights were measured and cleaning efficiencies were calculated. Table 3 lists the cleaning products evaluated.

Table 3. Cleaning Products Used

Multiclean 1568
Alukleen 36
Powerwash Clean BCR

Results: All three cleaners were very successful in removing the oil from the various types of substrates. The Multiclean solution was did not show good cleaning ability on the grease and lubricant. The Alukleen and the Powerwash Clean BCR removed the nearly all of the lubricant and neither were capable of cleaning the flux compound. The Alukleen was also able to remove the grease from the stainless steel coupons. Tables 4, 5 and 6 lists the results for each cleaning solution.

Table 4. Cleaning Results of Multiclean

Multiclean 1568	AL - GR	CN - LU	SS - OI
Coupon 1	119.05	9.89	99.28
Coupon 2	133.71	7.79	97.98
Coupon 3	206.06	62.2	96.71
Ave	152.94	26.63	97.99

Table 5. Cleaning Results of Alukleen

Alukleen 36	AL - LU	AL - FL	SS - OI	SS - GR
Coupon 1	88.47	2.75	92.82	98.39
Coupon 2	84.69	12.37	89	99.2
Coupon 3	88.19	3.69	91.75	98.51
Average	87.12	6.27	91.19	98.7

CLEANING LABORATORY EVALUATION SUMMARY

Table 6. Cleaning Results of Powerwash Clean BCR				
Clean BCR	AL - LU	BR - FL	BR - OI	SS - OI
Coupon 1	90.96	94.97	100.06	82.48
Coupon 2	91.69	37.59	99.79	86.27
Coupon 3	80.42	24.59	100.25	89.13
Average	87.69	52.38	100.03	85.96

Summary:

Substrates:	Aluminum, Brass, Copper, Nickel, Stainless Steel
Contaminants:	Cutting/Tapping Fluids, Fluxes, Greases, Lubricating/Lapping Oils, Oil

Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
Heatbath Corporation	Multi-Kleen 1568	5	97.99	☑	oil
Heatbath Corporation	Alu-Kleen 36	5	87.12	☑	lubricant
Heatbath Corporation	Alu-Kleen 36	5	6.27	☐	flux
Heatbath Corporation	Multi-Kleen 1568	5	153.00	☐	grease
Heatbath Corporation	Multi-Kleen 1568	5	26.63	☐	lubricant
Heatbath Corporation	Alu-Kleen 36	5	91.19	☑	oil
Heatbath Corporation	Alu-Kleen 36	5	98.70	☑	grease
Heatbath Corporation	Power Wash Cleaner BCR	5	87.69	☑	lubricant
Heatbath Corporation	Power Wash Cleaner BCR	5	52.38	☐	flux
Heatbath Corporation	Power Wash Cleaner BCR	5	100.03	☑	oil
Heatbath Corporation	Power Wash Cleaner BCR	5	85.96	☑	oil

Conclusion: Two of the cleaners, Alukleen and Powerwash Clean BCR, were found to be effective in removing multiple types of contaminants from a variety of surface materials.