CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2000
DateRun:	07/16/2000
Experimenters:	Jason Marshall, John Brunelle
ClientType:	Cleaner Manufacturer
ProjectNumber:	Project #1
Substrates:	Aluminum, Brass, Copper, Nickel, Plastic, Stainless Steel
PartType:	Coupon
Contaminants:	Adhesive, Cutting/Tapping Fluids, Fluxes, Greases, Inks, Lubricating/Lapping Oils, Oil
Cleaning Methods:	Immersion/Soak
Analytical Methods:	Gravimetric
Purpose:	To evaluate the effectiveness of client selected cleaners.
Experimental Procedure:	All the products were diluted to 5% using DI water in 600 ml beakers. The solutions were heated to 145 F on a hot plate. Preweighed coupons were coated with the listed contaminants and weighed again. Three coupons with one contaminant were submersed into a beaker agitated with a magnetic stir bar. Cleaning lasted for 5 minutes followed by a tap water rinse at 120 F for 30 seconds and finally allowed to dry overnight at room temperature. Final clean weights were measured and cleaning effectiveness was calculated.

SUBSTRATE MATERIAL: The surface materials used are listed in Table 1.
Table 1. Substrates Used
Substrate Code ID#
Aluminum AL 202-2024 T-3
Brass BR 202-260 CA-260
Copper/Nickel CN 202-715 70/30
Stainless Steel SS 202-17-4 HR-68
Plastic PL N/A

CONTAMINANTS: The contaminants tested are listed in Table 2.
Table 2. Contaminants Used
Contaminant Code CAS#
Adhesive, acrylic sealant 5504 AD N/A
Flux, Ersin 5381 RMA FL N/A
Grease, KSL-111 GR 64742-47-8
Ink, Steel Blue IK 64-17-5, 67-63-0, 8004873, 123864, 71363, 9004-70-0
Oil, Citgo 400NC OI 64741-89-5, 8052-42-4

Results: Calculated efficiencies are listed in Table 4.

Table 4. Cleaning Results.

Product	2001				
Subst/ Cont	AL-IK	BR-FL	CN-GR	SS-OI	PL-AD
Coupon 1	1.66	92.17	92.54	99.25	-3.02
Coupon 2	-9.01	98.01	82.28	97.58	-2.74
Coupon 3	-5.94	98.12	82.35	95.96	-3.85
Average	-4.43	96.1	85.72	97.6	-3.2
Product	2002				
Subst/ Cont	AL-IK	BR-FL	CN-GR	SS-OI	PL-AD
Coupon 1	-1.69	94.05	60.53	96.74	-2.62
Coupon 2	-0.83	96.03	48.57	95.54	-5.92
Coupon 3	-3.1	96.78	68.57	96.71	-2.45
Average	-1.87	95.62	59.22	96.33	-3.66
Product	2003				
Subst/ Cont	AL-IK	BR-FL	CN-GR	SS-OI	PL-AD
Coupon 1	-3.59	312.88	65.79	96.97	19.69
Coupon 2	-0.59	648.08	48.28	99.41	11.36
Coupon 3	0.03	547.3	44.83	97.56	11.19
Average	-1.39	502.75	52.96	97.98	14.08

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Product	2004				
Subst/ Cont	AL-IK	BR-FL	CN-GR	SS-OI	PL-AD
Coupon 1	-9.37	94.64	83.33	91.01	9.24
Coupon 2	-5.48	97.58	97.37	95.33	7.84
Coupon 3	5.43	98.2	90.12	93.92	-0.92
Average	-3.14	96.81	90.28	93.42	5.39
Product	2005				
Subst/ Cont	AL-IK	BR-FL	CN-GR	SS-OI	PL-AD
Coupon 1	-10.96	96.65	35.71	95.88	-42.18
Coupon 2	12.16	100.25	37.5	90.64	-53.37
Coupon 3	5.36	92.25	20	92.91	-81.09
Average	2.19	96.38	31.07	93.15	-58.88
Product	2006				
Subst/ Cont	AL-IK	BR-FL	CN-GR	SS-OI	PL-AD
Coupon 1	-13.85	55.49	74.65	82.48	-72.1
Coupon 2	-16.28	37.66	44.44	83.07	-44.19
Coupon 3	-11.84	59.18	-16.67	71.18	-113.23
Average	-13.99	50.77	34.14	78.91	-76.5
Product	2007				
Subst/ Cont	AL-IK	BR-FL	CN-GR	SS-OI	PL-AD
Coupon 1	45.28	19.06	23.81	54.35	-1.72
Coupon 2	34.04	23.13	45.45	80	-33.43
Coupon 3	16.67	23.37	62.07	67.65	-16.53
Average	32	21.85	43.78	67.33	-17.23
Product	2009				
Subst/ Cont	AL-IK	BR-FL	CN-GR	SS-OI	PL-AD
Coupon 1	79.55	96.59	90.14	94.41	7.25
Coupon 2	64.29	99.16	52.63	93.77	-3.59
Coupon 3	51.85	100.37	84.62	98.14	-48.95
Average	65.23	98.71	75.8	95.44	-15.1

Summary:

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

Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
Today & Beyond	Beyond 2001	5	96.10	☑	Flux, grease, oil
Today & Beyond	Beyond 2002	5	95.62	☑	flux, oil
Today & Beyond	Beyond 2003	5	97.98	☑	oil
Today & Beyond	Beyond 2004	5	96.81	☑	flux, grease, oil
Today & Beyond	Beyond 2005	5	96.38	☑	flux, oil
Today & Beyond	Beyond 2006	5	78.91	☐	oil
Today & Beyond	Beyond 2007	5	67.33	☐	oil
Today & Beyond	Beyond 2009	5	98.71	☑	flux, oil

Conclusion: