

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1998
 DateRun: 08/24/1998
 Experimenters: Jason Marshall
 ClientType: Electromagnetic Manufacturer
 ProjectNumber: Project #1
 Substrates: Copper, Nickel
 PartType: Coupon
 Contaminants: Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil
 Cleaning Methods:
 Analytical Methods: Gravimetric

Purpose: To identify aqueous cleaning solutions and equipment that will remove oil from metal tape.

Experimental Procedure: Six cleaners were selected based on the laboratory's database and vendor information. Five percent solutions were made using DI water in 400 mL beakers. Solutions were heated to 130 F on a hot plate. Eighteen preweighed coupons were contaminated with the oil using hand held swabs. Contaminated weights were recorded for each coupon. Three coupons were placed into each cleaner and cleaned for 5 minutes using stir bar agitation. Coupons were rinsed in tap water at 120 F for 30 seconds. Drying was performed using a Master Appliance Heat Gun model HG-301A for about 30 seconds and then air dried for 1 hour. Final clean weights were made and the percent removal of the oil was calculated.

SUBSTRATE MATERIAL: Copper/Nickel 70/30 coupons
 CONTAMINANTS: Oil-Castrol 10W-40

Results: Most of the cleaners selected removed a majority of the oil contaminant from the coupons. Table 1 lists the cleaning efficiencies for the 6 solutions tested.

Table 1 Cleaning Efficiencies

	Shopmaster	SWR One	AK 6215	Daraclean 282	Inproclean 3800	Luminol
Coupon 1	73.5	73.5	79.9	80.6	85.2	73.4
Coupon 2	53.6	68.5	85.3*	80.5	75.8	70.8
Coupon 3	64.4	78.5	81.0	82.9	64.0	74.7
Ave	63.8	73.5	82.1	81.3	75.0	73.0
Std Dev	9.98	5.0	2.85	1.36	10.6	1.99

*coupon dropped (85%) face down.

Of the cleaners tested only Shopmaster showed less than 70% removal of the contaminant. There were two cleaners which removed over 80%, Daraclean and AK 6215. Both will be used in the next set of test using ultrasonic energy.

Summary:

Substrates:		Copper, Nickel			
Contaminants:		Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil			
Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
Buckeye International	Shopmaster	5	63.80	<input type="checkbox"/>	
SWR Corporation	SWR One	5	73.50	<input type="checkbox"/>	
Calgon Corporation	AK 6215	5	82.10	<input checked="" type="checkbox"/>	
Magnaflux	Daraclean 282	5	81.30	<input checked="" type="checkbox"/>	
Oakite Products	Inproclean 3800	5	75.00	<input type="checkbox"/>	
Alconox Inc	Luminol	5	73.00	<input type="checkbox"/>	

Conclusion: Two aqueous cleaners, WR Grace's Daraclean 282 and Calgon's AK-6215, were found to have adequate cleaning capabilities of the Castrol motor oil. Further testing will be performed using a 40 kHz ultrasonic cleaning tank to enhance the cleaning efficiency of the two cleaners.