CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	1997
DateRun:	07/24/1997
Experimenters:	Jason Marshall, Prashant Trivedi
ClientType:	Machine Construction Company
ProjectNumber:	Project #1
Substrates:	Stainless Steel
PartType:	Coupon
Contaminants:	Coatings
Cleaning Methods:	Immersion/Soak
Analytical Methods:	Black light, Gravimetric
Purpose:	Non-hardening rust preventive cleaning trial.
Experimental Procedure:	Eighteen (18) coupons were weighed after being precleaned. The coupons were then contaminated with the slush like rust preventive compound. The coupons were allowed to set for about an hour and then weighed. Six chemistries were selected through analysis of experiments with similar conditions. Five percent solutions were prepared and heated to 150 F. Three coupons were placed in each cleaner with stir bar agitation for ten minutes. After cleaning, the coupons were rinsed in tap water at 120 F also with stir bar agitation and dried with a hot air gun for two minutes. Once the coupons cooled to room temperature, the final weights were obtained for the coupons. The coupons were then examined under black light since the contaminant fluoresces. SUBSTRATE MATERIAL: Stainless Steel CONTAMINANTS: Ferrocote 5802-HF, non-hardening rust preventive CONTAMINATING PROCESS USED: applied the rust preventive material using a swab onto pre-weighed coupons

Results:

%Contaminant Removed						
	Blue Gold	Precision	625-XL	AK-6215	2000XS	SP 2200
	99.97	99.92	99.22	99.05	99.93	98.91
	99.33	99.93	99.11	99.15	99.85	98.88
	100.02	99.93	99.36	99.55	99.89	99.50
Average	99.77	99.93	99.23	99.25	99.89	99.10
Std Dev	0.38	0.01	0.13	0.27	0.04	0.35
Ranking	3	1	5	4	2	6

All of the cleaners selected for the experiment showed excellent removal of the contaminant. The best cleaner was the Precision cleaner. Under the black light the coupons showed no visible sign of the contaminate, which compared nicely with the gravimetric results. The second best cleaner had little to no contaminate remaining then using the black light. The next best cleaner was Blue Gold, showing minimal amounts of contaminate. The remaining three cleaners, AK-6215, 625-XL and SP 2200, had moderate amounts of contaminate still visible under the black light. It was interesting to note that the order of cleanliness was the same using both observational methods.

Due to the high level of efficiency of all the cleaners, 99.1% - 99.9%, further observations were made during and after the experiment in order to help select the best cleaners. The conditions of the solutions were noted during the cleaning period, after the solution returned to room temperature and, finally, after the solutions were filtered through glass fiber filters.

Black Light Rating						
cleaner:	Blue Gold	Precision	625-XL	AK-6215	2000XS	SP 2200
Rating:	good/okay	excellent	okay/fair	okay	good	fair

Key for Black Light Rating: excellent-good-okay-fair-poor

Chemistry	Blue Gold	Precision	625-XL	AK-6215	2000XS	SP 2200
During Cleaning	surface contaminated, agitation helped to dissolve contamination	good cleaning action	large clumps on surface, majority was dissolved after 3-4 minutes	not all contaminate removed form coupons	big clumps on surface, majority was dissolved after 2-3 minutes	slow start, clumps at top, bath was cloudy
After Cleaning	most contaminate	contaminate at top	most contaminate at top,	contaminate at top	contaminate dissolved	contaminate dissolved

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	at top, some dissolved		some dissolved			
After filtration	good, slightly hazy	good/ excellent	okay/good- still cloudy	good/ excellent	okay, long filter time	good/ excellent, relatively free of contaminate

The during cleaning observations were based on visual inspection of the baths. After cleaning was determined using visual and black light observations. The after filtration observations were based using the black light. For an excellent observation, the solutions only fluoresces at the top with zero to minimal throughout the solution and for poor the solution would fluoresces throughout the entire solution.

Summary:

Substrates:	Stainless Steel				
Contaminants:	Coatings				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Carroll Company	Blue Gold Heavy Industrial Cleaner	5	99.78	☑	
LPS Laboratories	Precision Clean Concentrate	5	99.93	☑	
Quaker Chemical	Formula 625 XL	5	99.23	☑	
Calgon Corporation	AK 6215	5	99.25	☑	
US Polychem Corporation	Polychem A 2000 XS	5	99.89	☑	
Valtech Corporation	Valtron SP 2200	5	99.10	☑	

Conclusion:

All of the cleaners performed very well in the removal of the slush like rust preventive material from Quaker. The six cleaners were compared using gravimetric and black light. In each method the order of effectiveness was the same with Precision Clean being the best followed by 2000XS, Blue Gold, AK-6215, 625-XL and SP 2200.
Using the other methods of observations, Precision Clean again was the best. The next best cleaners were 625-XL, Blue Gold, AK-6215, SP 2200, and 2000XS. These were based on how easily the solutions could be maintained. Solutions that had the majority of the cleaner at the top would have a longer bath life due to the possible removal of contaminates via skimming or filtering out the solutions. The chemistries that had the contaminate dissolved throughout would eventually become saturated and have to be replaced. A further consideration in determining which cleaners to select will be how well the cleaners work at removing the second type of rust preventive substance. Therefore any recommendation will have to wait until after the next trial is performed and analyzed.