CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1998

DateRun: 07/08/1998

Experimenters: Jason Marshall

ClientType: Vessel Cleaning Company

ProjectNumber: Project #2

Substrates: Stainless Steel

PartType: Coupon

Contaminants: Resins/Rosins

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric

Purpose: To find a cleaning chemistry that would eliminate the flaking of the contaminant after the cleaning cycle.

Experimental Procedure: Nine cleaners were selected from SCL's databases based on previous uses and vendor information. Five percent solutions were made into 500 mL beakers using DI water. The solutions were heated to 130^{o}F on a hotplate.
Pre-weighed coupons were contaminated by being placed into the contaminant container. The coupons soaked for 40 minutes. At the end of the soaking, coupons sat for an additional 30 minutes at ambient conditions. Contaminated coupon weights were recorded. Three coupons were placed into each cleaner for five minutes with stir-bar agitation. Coupons were rinsed for 30 seconds in tap water at 120 F. Parts were air dried using compressed air at room temperature. Once the coupons were dry, final weights were obtained.
SUBSTRATE MATERIAL: Stainless Steel
CONTAMINANTS: Formaldehyde Based Resin
CONTAMINATING PROCESS USED: Coupons soaked in the contaminant for 40 minutes.

Results: Table-1 lists the cleaning efficiencies of each of the products tested. Several products removed 85% or better.

Table-1. Cleaner Efficiencies

	Buckeye	Chrisal	Star	*WR Grace*	*Gemtek*	EMKAY	*T-Square*	CSA Inc	Chesterton
Coupon 1	70.64	79.18	39.41	89.59	93.75	86.99	89.94	78.90	88.39
Coupon 2	94.31	94.11	79.85	90.33	93.58	93.18	97.05	82.81	62.85
Coupon 3	81.96	92.40	56.88	87.25	93.41	66.47	81.77	96.78	64.46
Ave	**82.30**	**88.563**	**58.72**	**89.06**	**93.58**	**82.21**	**89.58**	**86.16**	**71.90**
Std Dev	**11.84**	**8.17**	**20.28**	**1.61**	**0.17**	**13.98**	**7.65**	**9.40**	**14.30**

The most consistent and effective cleaner tested was Gemtek SC-1000, followed closely by T-Square, WR Grace and Chrisal. The coupons cleaned with Gemtek had little flaking develop after rinsing and drying. Improved operating conditions (pressure, longer cleaning time, etc.) could improve the efficiencies of these cleaners, thus lowering the amount of flaking even further.

Summary:

Substrates:	Stainless Steel				
Contaminants:	Resins/Rosins				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Buckeye International	Shopmaster	5	82.30	☐	
Chrisal USA Inc	Super CMF 240	5	88.56	☑	
By Pas and Star Products	Star Cleaning Miracle # 50	5	58.71	☐	
Magnaflux	Daraclean 232	5	89.06	☑	
Gemtek Products	SC 1000 Aqueous Cleaner Concentrate	5	93.58	☑	
Emkay Chemical Company	Safety Wash	5	82.21	☐	
Tarksol Inc	Tarksol HTF-50	5	89.59		

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CSA Inc	Bio Safe 1023	5	86.17	☐	
AW Chesterton	803 Industrial & Marine Solvent II	5	71.90	☐	

Conclusion: Three cleaning chemistries removed 90% of the contaminant after a five-minute soak. Even though the cleaners were tested with immersion cleaning, the chemistries can be used in a high-pressure system. Other adjustments to the testing conditions may yield higher cleaning efficiencies.