

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1996  
 DateRun: 03/21/1996  
 Experimenters: Jay Jankauskas  
 ClientType: Plastic Switch Maker  
 ProjectNumber: Project #1  
 Substrates: Plastic  
 PartType: Coupon  
 Contaminants: Cutting/Tapping Fluids, Greases, Inks, Lubricating/Lapping Oils, Oil  
 Cleaning Methods: Immersion/Soak  
 Analytical Methods: Gravimetric  
 Purpose: Further evaluation for ethanol replacement

**Experimental Procedure:** The goal of this trial is to determine which chemistries would be a suitable substitution for ethanol. From yesterday's experiment, six chemistries were chosen for reason of ink adhesion, low amount of residue and ease of drying. These six chemistries (Terpene Tech HTF-321, Oakite Inproclean 1300, Nalgene L900, Mirachem Corp. Mirachem 500, Man-Gil Gillite 0650-Cl, MacDermid ND-17), were tested against isopropanol to determine their effectiveness in removing uncured inks and greases. Fourteen switchboxes were contaminated. Seven switchboxes were spread with both the white and the black inks. The other seven switch parts were spread with both greases. One switchbox of each contaminant will be cleaned in a full-strength solution of each chemistry. Cleaning took place for 15 minutes in a beaker with stir-bar agitation at room temperature. After cleaning the parts were rinsed in tap water for 5 seconds and then left to dry under UV light for 10 minutes. To analyze cleanliness, parts were weighed before and after contamination and after cleaning and a percentage removal was determined.

**SUBSTRATE MATERIAL:** plastic switch parts  
**CONTAMINANTS:** Markem black and white dies, dark and light greases.  
**CONTAMINATING PROCESS USED:** Rubbed on with swab.

Results:

sample # and chemistry	Contaminant	clean mass (g)	mass with cont (g)	mass after cleaning (g)	contaminant removed (g)	Percent Removal
1-Isopropanol	inks	0.8518	0.8595	0.8531	0.0064	83.12%
8-Isopropanol	greases	0.8551	0.8647	0.8561	0.0086	89.58%
2-HTF321	inks	0.8486	0.8559	0.8526	0.0033	45.21%
9-HTF321	greases	0.8467	0.8634	0.8609	0.0025	14.97%
3-Inproclean 1300	inks	0.8505	0.8529	0.8514	0.0015	62.50%
10-Inproclean 1300	greases	0.8467	0.8617	0.8577	0.004	26.67%
4-Mirachem 500	inks	0.8524	0.8545	0.8524	0.0021	100.00%
11-Mirachem 500	greases	0.8497	0.8597	0.8541	0.0056	56.00%
5-Nalgene L900	inks	0.8508	0.8529	0.8519	0.001	47.62%
12-Nalgene L900	greases	0.8555	0.8650	0.8650	0.0000	0.00%
6-Gillite 0651Cl	inks	0.8426	0.8467	0.8447	00.002	48.78%
13-Gillite 0651Cl	greases	0.8466	0.8554	0.8526	0.0028	31.82%
7 ND-17	inks	0.8456	0.8486	0.8456	0.003	100.00%

## CLEANING LABORATORY EVALUATION SUMMARY

14 ND-17	greases	0.8572	0.8690	0.8627	0.0063	53.39%
----------	---------	--------	--------	--------	--------	--------

Summary:

<b>Substrates:</b>	Plastic				
<b>Contaminants:</b>	Cutting/Tapping Fluids, Greases, Inks, Lubricating/Lapping Oils, Oil				
<b>Company Name:</b>	<b>Product Name:</b>	<b>Conc.:</b>	<b>Efficiency:</b>	<b>Effective:</b>	<b>Observations:</b>
Tarksol Inc	Tarksol HTF 321	100	45.21	<input type="checkbox"/>	
Oakite Products	Inproclean 1300	100	62.50	<input checked="" type="checkbox"/>	
Nalge Company	Nalgene L 900	100	47.62	<input type="checkbox"/>	
Mirachem Corporation	Mirachem 500	100	100.00	<input checked="" type="checkbox"/>	
Man Gill Chemical Company	Gillite 0650 CI	100	48.78	<input type="checkbox"/>	
MacDermid Industrial Products	ND 17	100	100.00	<input checked="" type="checkbox"/>	
Fisher Scientific	Isopropanol a459-4 70% VV (CAS:67-63-0)	100	89.58	<input type="checkbox"/>	

Conclusion:

Both the Mirachem Corp. Mirachem 500 and the Macdermid ND-17 were more effective in removing the inks than the isopropanol but were not as effective in removing the greases.