CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2007

DateRun: 02/07/2007

Experimenters: Jason Marshall

ClientType: Consultant

ProjectNumber: Project #1

Substrates: Aluminum

PartType: Coupon

Contaminants: Oil

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric

Purpose: To evaluate four binary azeotropes for removing oil from aluminum coupons using immersion cleaning.

Experimental Procedure: The four supplied solvents were mixed with DI water in 600 ml beakers to obtain binary azeotropes. Methyl Acetate (MeOAc) was mixed with water (95% water) and heated to 56.1 C on a hot plate. T-Butyl Acetate (t-BAc) was mixed with water (16.5% water) and heated to boiling at 87.4 C. Propylene Glycol Methyl Ether (PGME) was mixed with water (51% water) and heated to 97.5 C. The final blend consisted of Heptane mixed with water (12.9% water) and heated to 79.2 C.

Twelve preweighed aluminum coupons were coated with CP Hall Co Plasthall Eso oil (8013-07-8) with a handheld swab. Coupons were weighed again to determine the amount of oil applied. Three coupons were cleaned in each azeotrope for five minutes at the boiling point, rinsed for 15 seconds in 120 F tap water and dried for 30 seconds using compressed air at room temperature. Coupons were weighed a third time to determine the amount of oil remaining. Efficiencies were calculated and recorded.

Results: Two of the four azeotropes removed over 98% of the canola oil. The table lists the amount of soil added, the amount remaining, and the efficiency of each coupon cleaned.

Azeotrope	Initial wt	Final wt	% Removed
MeOAc	0.2587	0.1138	56.01
	0.7266	0.1149	84.19
	0.6344	0.1902	70.02
t-BAc	0.6208	0.0022	99.65
	0.6846	0.0014	99.80
	0.4129	0.0037	99.10
PGME	0.3868	0.0669	82.70
	0.5283	0.0745	85.90
	0.5412	0.0913	83.13
Heptane	0.4839	0.0084	98.26
	0.4815	0.0052	98.92
	0.5208	0.0068	98.69

Summary:

Substrates:	Aluminum				
Contaminants:	Oil				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
No Specific Vendor	Methyl Acetate-water	5	70.07	☐	
No Specific Vendor	t-Butyl Acetate-water	83.5	99.52	☑	
No Specific Vendor	Propylene Glycol Methl Ether-water	49	83.91	☐	
J.T. Baker	Heptane Low water	87.1	98.63	☑	

Conclusion: The heptane-water azeotrope removed 98.6% of the canola oil, the t-Bac-water removed 99.5%, PGME-water removed 83.9% and the MeOAc removed 70.1%.