CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2003
DateRun:	02/28/2003
Experimenters:	Jason Marshall
ClientType:	Medical Instrument Mfr
ProjectNumber:	Project #1
Substrates:	Plastic
PartType:	Part
Contaminants:	Hucker's Soil
Cleaning Methods:	Mechanical Agitation
Analytical Methods:	Gravimetric, Photography
Purpose:	To use successful cleaners on supplied tubing with Hucker's Soil.
Experimental Procedure:	Five cleaners were selected from the previous test. These products were diluted to 5% using DI water in 600 ml beakers. The two supplied cleaners were diluted to concentrations used by client in 600 ml beakers. All seven cleaners were heated to 130 F on a hot plate. Photographs were taken of clean tubing pieces. The inside of 21 preweighed PVC tubing pieces (3" long) were coated with the supplied Hucker' Soil (Creamy Peanut Butter, Salted Butter, Wheat gluten, Egg Yolk, Evaporated milk, DI water, Printer's ink with boiled linseed oil, India Ink, Saline Solution) using a squeeze bulb and then allowed to dry. The tubing was weighed and photographed again to determine the amount of soil added. Three pieces were cleaned in each solution for 5 minutes using mechanical agitation (moving pieces back and forth at an angle) at 130 F. Rinsing was performed for 15 seconds in tap water at 120 F and followed by drying with a forced air at for 30 seconds at 68 F. Once the tubing cooled to room temperature, final weights were recorded, pictures were taken and efficiencies were calculated.
Results:	Even though all of the products removed over 95% of the soil from the inside of the PVC tubing, most of the products left visual residue behind. Micro 90 and Lestoil had the highest efficiency and the least amount of visual residue. (See attached pictures). The table below lists the amount of soil added and removed from the PVC tubing.

Table 1. Soil Removal

Cleaner	Initial wt	Final wt	% Removed
United 450 All Clear	0.3958	0.0050	98.74
	0.6270	0.0077	98.77
	0.5527	0.0059	98.93
Aluminum Aerowash	0.4295	0.0146	96.60
	0.5115	0.0134	97.38
	0.3590	0.0122	96.60
Micro 90	0.6499	0.0064	99.02
	0.4408	0.0030	99.32
	0.3476	0.0035	98.99
Sea Wash 8	0.5599	0.0096	98.29
	0.5540	0.0118	97.87
	0.6216	0.0113	98.18
SC Aircraft &Metal	0.5614	0.0216	96.15
	0.4242	0.0133	96.86
	0.4704	0.0182	96.13
Simple Green D	0.4444	0.0126	97.16
	0.4365	0.0091	97.92
	0.6083	0.0129	97.88
Lestoil	0.5343	0.0050	99.06
	0.3574	0.0026	99.27
	0.2603	0.0033	98.73

Summary:

Substrates:	Plastic
Contaminants:	Hucker's Soil

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Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
United Laboratories International	United 450 All Clear	5	98.81	☑	
Magnum Research Corporation	Aluminum Aerowash	5	96.86	☑	
International Products Corporation	Micro 90 Conc.	5	99.11	☑	
Warren Chemical Company	Sea Wash 8 No Force	5	98.11	☑	
Gemtek Products	SC Aircraft & Metal Cleaner Super Concentrate	5	96.38	☑	
Clorox Company	Lestoil	2	99.02	☑	
Simple Green	Simple Green D	5	97.65	☑	

Conclusion: Visual amounts of oil residue were visible on all of the tubing pieces. Additional time or temperature may help to reduce the remaining oil.