

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:

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|----------------------|---------------|
| 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 | <input checked="" type="checkbox"/> | |
| Magnum Research Corporation | Aluminum Aerowash | 5 | 96.86 | <input checked="" type="checkbox"/> | |
| International Products Corporation | Micro 90 Conc. | 5 | 99.11 | <input checked="" type="checkbox"/> | |
| Warren Chemical Company | Sea Wash 8 No Force | 5 | 98.11 | <input checked="" type="checkbox"/> | |
| Gemtek Products | SC Aircraft & Metal Cleaner Super Concentrate | 5 | 96.38 | <input checked="" type="checkbox"/> | |
| Clorox Company | Lestoil | 2 | 99.02 | <input checked="" type="checkbox"/> | |
| Simple Green | Simple Green D | 5 | 97.65 | <input checked="" type="checkbox"/> | |

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.