

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2013
 DateRun: 10/30/2013
 Experimenters: Junhee Cho, Loc Nguyen
 ClientType: Cleaning Equipment Mfr
 ProjectNumber: Project #1
 Substrates: Aluminum
 PartType: Coupon
 Contaminants: Oil, Food
 Cleaning Methods: Manual Wipe
 Analytical Methods: Gravimetric

Purpose: To evaluate three supplied products for all purpose cleaning

Experimental Procedure: Aluminum and Chrome coupons were weighed and then coated with vegetable oil soil using a hand held swab and then aged in the oven at 190 degree Celcius for 5 minutes. Then the soil was allowed to cool to room temperature and weighted to determine the amount of soil added. Then three coupons were placed into a Gardner Straight Line Washability unit. A Kimberly-Clark Wypal reinforced paper towel was attached to the cleaning sled and soaked with 1 spray of cleaning solution. Each coupon was sprayed once with the same cleaning solution. The cleaning unit was run for 20 cycles (~33 seconds). At the end of the cleaning, coupons were wiped once with a dry paper towel. Final weights were recorded, efficiencies were calculated and recorded.

ChemistriesEvaluated: Toucan Cleaner (1 g salt/1.5L); Proforce Pink 100%; Dawn Ultra Apple .1%;

Results: Free Chlorine level was measured using test strips and recorded to be 50-100 ppm. The pH of the solution was between 8 and 9.
 All three products worked well on the aged light oil using manual cleaning.

| Cleaner | Initial wt | Final wt | % Removed | Ave % Removed | Product Ave |
|-------------------------------|------------|----------|-----------|---------------|-------------|
| Toucan_Aluminum_Oil | | | | | 95.84 |
| | 0.2072 | 0.0101 | 95.13 | | |
| | 0.2389 | 0.0064 | 97.32 | | |
| | 0.2657 | 0.0058 | 97.82 | 96.75 | |
| Toucan_Chrome_Oil | | | | | |
| | 0.2862 | 0.0153 | 94.65 | | |
| | 0.1325 | 0.0081 | 93.89 | | |
| | 0.2702 | 0.0101 | 96.26 | 94.93 | |
| Pro-Force Pink_Aluminum_Oil | | | | | 97.40 |
| | 0.2365 | 0.0062 | 97.38 | | |
| | 0.2206 | 0.0065 | 97.05 | | |
| | 0.3397 | 0.0058 | 98.29 | 97.57 | |
| Pro-Force Pink_Chrome_Oil | | | | | |
| | 0.2505 | 0.0063 | 97.49 | | |
| | 0.2754 | 0.0067 | 97.57 | | |
| | 0.1557 | 0.0052 | 96.66 | 97.24 | |
| Dawn Ultra Apple_Aluminum_Oil | | | | | 96.83 |
| | 0.2978 | 0.0062 | 97.92 | | |
| | 0.1697 | 0.0056 | 96.70 | | |
| | 0.1312 | 0.0061 | 95.35 | 96.66 | |
| Dawn Ultra Apple_Chrome_Oil | | | | | |
| | 0.1719 | 0.007 | 95.93 | | |
| | 0.1988 | 0.0063 | 96.83 | | |
| | 0.4420 | 0.0078 | 98.24 | 97.00 | |

Summary:

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|----------------------|----------------------|---------------|--------------------|-------------------------------------|----------------------|
| Substrates: | Aluminum | | | | |
| Contaminants: | Oil, Food | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Toucan | Toucan Eco | 100 | 95.84 | <input checked="" type="checkbox"/> | |
| Fisher Scientific | Absolute Ethanol | 0 | 0.00 | <input type="checkbox"/> | |
| EcoLab | Proforce Pink | 100 | 97.40 | <input checked="" type="checkbox"/> | |
| Procter & Gamble | Dawn Ultra Apple | 1 | 96.83 | <input checked="" type="checkbox"/> | |

Conclusion: All of the products were effective at removing more than 95% of the vegetable oil from the surfaces using manual wiping.