

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2005
DateRun: 09/22/2005
Experimenters: Jason Marshall
ClientType: Lab
ProjectNumber: Project #1
Substrates: Aluminum
PartType: Coupon
Contaminants: Oil
Cleaning Methods: Immersion/Soak
Analytical Methods: Gravimetric, Visual

Purpose: Laboratory evaluations of alternative cleaning products

Experimental Procedure: Basic cleaning performance testing was conducted using ASTM G122 as the bases for cleaning. Eight products were evaluated for the removal of C-Eblis cutting oil from aluminum coupons using immersion cleaning. The products were diluted to 5% using DI water in 600 ml beakers. Water was also evaluated as a control. Twenty-seven preweighed aluminum coupons were coated with the oil using a handheld swab. Coupons were weighed again to determine the amount of oil added. Three coupons were cleaned in each solution for 5 minutes using stir-bar agitation at room temperature. Coupons were rinsed in a tap water bath for 15 seconds at room temperature and rinsed for 2 minutes using a Master Appliance Heat Gun at 300 F. Final weights were measured and efficiencies were calculated.

Results:

| Cleaner | Initial | wt Final wt | % Removed |
|---------------------|---------|----------------|--------------|
| KPC 820 N | 0.1827 | 0.0601 | 67.10 |
| | 0.4339 | 0.0680 | 84.33 |
| | 0.2917 | 0.0748 | 74.36 |
| Formula 815 GD | 0.2720 | 0.0916 | 66.32 |
| | 0.2457 | 0.0696 | 71.67 |
| | 0.2759 | 0.0981 | 64.44 |
| Shopmaster | 0.3328 | 0.0689 | 79.3 |
| | 0.2751 | 0.0728 | 73.54 |
| | 0.3290 | 0.0381 | 88.42 |
| SC Aircraft & Metal | 0.3580 | 0.0897 | 74.94 |
| | 0.3046 | 0.0889 | 70.81 |
| | 0.1934 | 0.0800 | 58.63 |
| Surface Cleanse 930 | 0.1396 | 0.0681 | 51.22 |
| | 0.2323 | 0.0346 | 85.11 |
| | 0.3384 | 0.0728 | 78.49 |
| Daraclean 283 | 0.4045 | 0.1203 | 70.26 |
| | 0.2523 | 0.0981 | 61.12 |
| | 0.2198 | 0.0804 | 63.42 |
| Inproclean 3800 | 0.2446 | 0.0759 | 68.97 |
| | 0.3051 | 0.0719 | 76.43 |
| | 0.2476 | 0.0908 | 63.33 |
| Beyond 2001 | 0.2125 | 0.0765 | 64.00 |
| | 0.2463 | 0.1090 | 55.75 |
| | 0.2582 | 0.1639 | 36.52 |
| Water | 0.2184 | 0.1686 | 22.8 |
| | 0.2743 | 0.1591 | 42.00 |
| | 0.1990 | 0.1443 | 27.49 |

Prior to weighing, coupons were inspected to rank the products for performance based on visual observations. The table below lists the calculated ranking from gravimetric analysis and compares to two visual observation rankings.

| | |
|--|---------|
| | Ranking |
|--|---------|

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| Product | Gravimetric | Visual 1 | Visual 2 |
|---------------------|-------------|-------------|-------------|
| KPC 820 N | 2 | 1 | 1 |
| Formula 815 GD | 6 | 3 | 2 |
| Shopmaster | 1 | 2 | 3 |
| SC Aircraft & Metal | 5 | 4 | 4 |
| Surface Cleanse 930 | 3 | 5 | 5 |
| Daraclean 283 | 7 | 7 | 8 |
| Inproclean 3800 | 4 | 6 | 6 |
| Beyond 2001 | 8 | 8 | 9 |
| Water | 9 | 9 | 7 |

Summary:

| Substrates: | Aluminum | | | | |
|------------------------------------|---|--------|-------------|--------------------------|---------------|
| Contaminants: | Oil | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| AW Chesterton | KPC 820 N | 5 | 75.26 | <input type="checkbox"/> | |
| Brulin Corporation | Formula 815 GD | 5 | 67.48 | <input type="checkbox"/> | |
| Buckeye International | Shopmaster | 5 | 80.42 | <input type="checkbox"/> | |
| Gemtek Products | SC Aircraft & Metal Cleaner Super Concentrate | 5 | 68.13 | <input type="checkbox"/> | |
| International Products Corporation | Surface Cleanse Concentrated Neutral 930 | 5 | 71.60 | <input type="checkbox"/> | |
| Magnaflux | Daraclean 283 | 5 | 64.93 | <input type="checkbox"/> | |
| Oakite Products | Inproclean 3800 | 5 | 69.58 | <input type="checkbox"/> | |
| Today & Beyond | Beyond 2001 | 5 | 52.09 | <input type="checkbox"/> | |
| Water | Water | 100 | 30.76 | <input type="checkbox"/> | |

Conclusion:

No product removed over 85% of the oil under the conditions tested.