

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2004
 DateRun: 05/26/2004
 Experimenters: Jason Marshall
 ClientType: Lab
 ProjectNumber: Project #1
 Substrates: Steel
 PartType: Coupon
 Contaminants: Coatings
 Cleaning Methods: Immersion/Soak
 Analytical Methods: Gravimetric

Purpose: Laboratory evaluations of alternative cleaning products

Experimental Procedure: Basic cleaning performance testing was conducted using ASTM G122 as the bases for cleaning. All products were used heated to 96 F on a hot plate in 250 ml beakers. Eighteen preweighed steel coupons were coated with Rochester Midland RI780 rust preventative (80252-41-3, 95-63-6) using a handheld swab. The oil was then heated with a Master Appliance Heat gun at 300 F for 10 minutes. After cooling to room temperature, a second weighing was performed to determine the amount of soil that was added. Three coupons were cleaned in each solution for 5 minutes with minimal stir-bar agitation. After drying, coupons were weighed a final time to determine the cleaning efficiency of each product.

Results:

| Cleaner | Initial wt | Final wt | % Removed |
|------------------------|------------|----------|-----------|
| Vertrel MCA | 0.02000 | 0.00150 | 92.50 |
| | 0.12690 | 0.00340 | 97.32 |
| | 0.13150 | 0.00090 | 99.32 |
| Heavy Duty Degreaser C | 0.08620 | 0.00130 | 98.49 |
| | 0.10970 | 0.00020 | 99.82 |
| | 0.06960 | 0.00110 | 98.42 |
| HFE 7100 | 0.07200 | 0.00300 | 95.83 |
| | 0.11920 | 0.00460 | 96.14 |
| | 0.12210 | 0.00450 | 96.31 |
| OS 10 | 0.11220 | 0.00320 | 97.15 |
| | 0.04570 | 0.00560 | 87.75 |
| | 0.10070 | 0.00600 | 94.04 |
| OS 20 | 0.10830 | 0.00190 | 98.25 |
| | 0.07100 | 0.00490 | 93.10 |
| | 0.03590 | 0.00360 | 89.97 |
| OS 30 | 0.10170 | 0.00870 | 91.45 |
| | 0.08370 | 0.01390 | 83.39 |
| | 0.07100 | 0.01020 | 85.63 |

Summary:

| Substrates: | Steel | | | | |
|----------------------|------------------------|--------|-------------|-------------------------------------|---------------|
| Contaminants: | Coatings | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| DuPont | Vertrel MCA | 100 | 96.38 | <input checked="" type="checkbox"/> | |
| Micro Care | Heavy Duty Degreaser C | 100 | 98.91 | <input checked="" type="checkbox"/> | |
| 3M | HFE 7100 | 100 | 96.10 | <input checked="" type="checkbox"/> | |
| Dow Chemical Company | OS 10 | 100 | 92.98 | <input checked="" type="checkbox"/> | |
| Dow Chemical Company | OS 20 | 100 | 93.77 | <input checked="" type="checkbox"/> | |
| Dow Chemical Company | OS 30 | 100 | 86.82 | <input checked="" type="checkbox"/> | |

Conclusion: All six products removed over 85%.