

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2008
 DateRun: 06/17/2008
 Experimenters: Jason Marshall, Shweta Bansal
 ClientType: Tool Manufacturer
 ProjectNumber: Project #1
 Substrates: Steel
 PartType: Coupon
 Contaminants: Cutting/Tapping Fluids
 Cleaning Methods: Ultrasonics
 Analytical Methods: Gravimetric
 Purpose: To evaluate additional products using ultrasonic energy on the first supplied soil.

Experimental Procedure: Four products were selected from the lab's on-line database, www.cleansolutions.org, based on supplied information from client. Four from the previous trial were selected on performance on the supplied soil. Each product was diluted to 5% using DI water in 600 ml glass beakers. Solutions were heated to 130 F on immersed in a heat bath in a Branson 40 kHz ultrasonic tank. Products were degassed for five minutes. Twenty-four preweighed steel coupons were coated with the Castrol Industrial Inc Safety Draw 722X (61788-76-9, 64742-54-7) using a swab. Coupons were weighed a second time to determine the amount of soil added. Three coupons were immersed into each product and cleaned for 5 minutes using ultrasonic agitation. Following cleaning, coupons were rinsed for 15 seconds in tap water at 120 F and dried using air blow off for 30 seconds at room temperature. Final weights were recorded, and efficiencies were calculated.

Results: The addition of ultrasonic energy improved cleaning results for the four previously tested products. The additional four products also were found to be effective as well. Of the eight products, seven removed over 80% of the Safety Draw within 5 minutes of cleaning. Four of these products removed more than 98%. The table lists the amount of soil added, the amount remaining and the efficiency for each coupon cleaned.

| Cleaner | Initial wt | Final wt | % Removed |
|----------------------|------------|----------|-----------|
| Surface Cleanse 930 | 0.5202 | 0.0915 | 82.41 |
| | 0.4321 | 0.1184 | 72.60 |
| | 0.8422 | 0.0832 | 90.12 |
| SC Aircraft | 0.3650 | 0.2384 | 34.68 |
| | 0.3672 | 0.0276 | 92.48 |
| | 0.8338 | 0.1527 | 81.69 |
| M Aero | 0.6852 | 0.0221 | 96.77 |
| | 0.7399 | 0.0010 | 99.86 |
| | 0.3940 | 0.0086 | 97.82 |
| Polyspray Jet 790 xs | 0.7679 | 0.0104 | 98.65 |
| | 0.3692 | 0.0014 | 99.62 |
| | 0.5347 | -0.0010 | 100.19 |
| Metalnox M6310 | 0.3681 | 0.0865 | 76.50 |
| | 0.5443 | 0.0561 | 89.69 |
| | 0.3304 | -0.0075 | 102.27 |
| Daraclean 282 GF | 0.7463 | 0.0104 | 98.61 |
| | 0.5848 | 0.0046 | 99.21 |
| | 0.4377 | 0.0065 | 98.51 |
| Micro 90 | 0.7452 | 0.0239 | 96.79 |
| | 0.7318 | 0.0881 | 87.96 |
| | 0.5172 | 0.1007 | 80.53 |
| Luminox | 0.4334 | 0.0109 | 97.49 |
| | 0.9377 | 0.0241 | 97.43 |
| | 0.6763 | 0.0030 | 99.56 |

Summary:

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| Substrates: | Steel |
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| Contaminants: | | Cutting/Tapping Fluids | | | |
|------------------------------------|---|------------------------|--------------------|-------------------------------------|----------------------|
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| International Products Corporation | Surface Cleanse Concentrated Neutral 930 | 5 | 81.71 | <input checked="" type="checkbox"/> | |
| Gemtek Products | SC Aircraft & Metal Cleaner Super Concentrate | 5 | 69.62 | <input type="checkbox"/> | |
| Church & Dwight Co Inc. | Armakleen M Aero | 5 | 98.15 | <input checked="" type="checkbox"/> | |
| US Polychem Corporation | Polyspray Jet 790 XS | 5 | 99.48 | <input checked="" type="checkbox"/> | |
| Kyzen Corporation | Metalnox M6310 (For Comparison Only) | 5 | 89.49 | <input checked="" type="checkbox"/> | |
| Magnaflux | Daraclean 282 GF | 5 | 98.78 | <input checked="" type="checkbox"/> | |
| International Products Corporation | Micro 90 Conc. | 5 | 88.43 | <input checked="" type="checkbox"/> | |
| Alconox Inc | Luminox | 5 | 98.16 | <input checked="" type="checkbox"/> | |

Conclusion:

The seven top performing products will be evaluated on the second supplied contaminant using ultrasonic cleaning.