

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2008

DateRun: 06/19/2008

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 top performing products on second supplied contaminant using ultrasonic cleaning

Experimental Procedure: The top seven products were selected from the previous lab trial. 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-one preweighed steel coupons were coated with the Tru-Edge Cutting Fluid 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: Six of the seven products removed more than 90% of the cutting fluid using ultrasonic cleaning for five minutes. Five of these removed over 99%. 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 | 0.2168 | 0.0692 | 68.08 |
| | 0.3967 | 0.0848 | 78.62 |
| | 0.4485 | 0.0886 | 80.25 |
| M Aero | 0.4262 | 0.0070 | 98.36 |
| | 0.6946 | 0.0153 | 97.80 |
| | 0.4470 | -0.0078 | 101.74 |
| Polyspray Jet 790 xs | 0.3999 | -0.0018 | 100.45 |
| | 0.3277 | 0.0006 | 99.82 |
| | 0.2444 | 0.0005 | 99.80 |
| Metalnox M6310 | 0.3277 | 0.0021 | 99.36 |
| | 0.3719 | 0.0028 | 99.25 |
| | 0.2842 | -0.0008 | 100.28 |
| Daraclean 282 GF | 0.3626 | -0.0032 | 100.88 |
| | 0.3422 | -0.0005 | 100.15 |
| | 0.3434 | -0.0037 | 101.08 |
| Micro 90 | 0.1917 | 0.0020 | 98.96 |
| | 0.3703 | -0.0001 | 100.03 |
| | 0.4123 | 0.0005 | 99.88 |
| Luminox | 0.2849 | 0.0164 | 94.24 |
| | 0.3426 | 0.0165 | 95.18 |
| | 0.3976 | 0.0253 | 93.64 |

Summary:

| | | | | | |
|------------------------------------|--|---------------|--------------------|-------------------------------------|----------------------|
| Substrates: | Steel | | | | |
| Contaminants: | Cutting/Tapping Fluids | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| International Products Corporation | Surface Cleanse Concentrated Neutral 930 | 5 | 75.65 | <input type="checkbox"/> | |
| Church & Dwight Co Inc. | Armakleen M Aero | 5 | 99.30 | <input checked="" type="checkbox"/> | |

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|------------------------------------|--------------------------------------|---|--------|-------------------------------------|--|
| US Polychem Corporation | Polyspray Jet 790 XS | 5 | 100.02 | <input checked="" type="checkbox"/> | |
| Kyzen Corporation | Metalnox M6310 (For Comparison Only) | 5 | 99.63 | <input checked="" type="checkbox"/> | |
| Magnaflux | Daraclean 282 GF | 5 | 100.70 | <input checked="" type="checkbox"/> | |
| International Products Corporation | Micro 90 Conc. | 5 | 99.62 | <input checked="" type="checkbox"/> | |
| Alconox Inc | Luminox | 5 | 94.35 | <input checked="" type="checkbox"/> | |

Conclusion:

The six effective products will be evaluated on the third supplied contaminant.