

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2006
DateRun: 08/15/2006
Experimenters: Jason Marshall
ClientType: Metal Working
ProjectNumber: Project #1
Substrates: Cold Rolled Steel
PartType: Coupon
Contaminants: Oil
Cleaning Methods: Immersion/Soak
Analytical Methods: Gravimetric

Purpose: To evaluate successful cleaners on the third supplied oil using immersion cleaning.

Experimental Procedure: Five successful products from the first two oil removal trials were evaluated on the third oil. The products were diluted to 5% in 600 ml beakers using DI water and heated to 130 F on a hot plate.

Fifteen pre-weighed coupons were coated with US Oil Company US Blanking Oil 250 using a hand held swab. Coupons were weighed a second time to determine the amount of oil added. Three coupons were cleaned in each solution for five minutes using minimal stir bar agitation. Coupons were rinsed for 15 seconds in a tap water bath at 120 F and dried using a Master Appliance Heat gun at 500 F for 30 seconds. Once dry coupons were weighed a final time and product efficiencies were calculated.

Results: All five products removed over 85% of the blanking oil from the cold rolled steel coupons. Three of the five removed over 95%. The follow table lists the amount of oil added, the amount remaining and the efficiency for each coupon cleaned.

| Cleaner | Initial wt | Final wt | % Removed |
|---------------------|------------|----------|-----------|
| Surface Cleanse 930 | 0.3495 | 0.0360 | 89.70 |
| | 0.2345 | 0.0369 | 84.26 |
| | 0.3227 | 0.0406 | 87.42 |
| Aquavantage 1400 | 0.2590 | 0.0383 | 85.21 |
| | 0.2109 | 0.0404 | 80.84 |
| | 0.2184 | 0.0216 | 90.11 |
| Inproclean 3800 | 0.2704 | 0.0130 | 95.19 |
| | 0.3418 | 0.0129 | 96.23 |
| | 0.3548 | 0.0219 | 93.83 |
| Sea Wash Blue | 0.4008 | 0.0042 | 98.95 |
| | 0.3153 | 0.0082 | 97.40 |
| | 0.3284 | 0.0032 | 99.03 |
| Mirachem 500 | 0.4318 | 0.0120 | 97.22 |
| | 0.2906 | 0.0195 | 93.29 |
| | 0.6219 | 0.0092 | 98.52 |

Summary:

| Substrates: | | Cold Rolled Steel | | | | |
|------------------------------------|--|-------------------|-------------|-------------------------------------|---------------|--|
| Contaminants: | | Oil | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: | |
| International Products Corporation | Surface Cleanse Concentrated Neutral 930 | 5 | 87.13 | <input checked="" type="checkbox"/> | | |
| Brulin Corporation | Aquavantage 1400 | 5 | 85.39 | <input checked="" type="checkbox"/> | | |
| Oakite Products | Inproclean 3800 | 5 | 95.08 | <input checked="" type="checkbox"/> | | |
| Warren Chemical Company | Sea Wash Blue | 5 | 98.46 | <input checked="" type="checkbox"/> | | |
| Mirachem Corporation | Mirachem 500 | 5 | 96.34 | <input checked="" type="checkbox"/> | | |

Conclusion: All five products will be used on the fourth supplied oil.