

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2006  
 DateRun: 08/21/2006  
 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 the five previously tested products on the fourth supplied oil.

Experimental Procedure: Five successful products from the first three oil removal trials were evaluated on the fourth 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 Lamson Oil Co Heavy Draw 1290 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: Three of the five products removed over 85% of the oil within five minutes of immersion cleaning. 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 | 0.4016     | 0.0895   | 77.71     |
|                     | 0.1608     | 0.0579   | 63.99     |
|                     | 0.3613     | 0.0569   | 84.25     |
| Aquavantage 1400    | 0.3448     | 0.0495   | 85.64     |
|                     | 0.3903     | 0.0375   | 90.39     |
|                     | 0.3466     | 0.0472   | 86.38     |
| Inproclean 3800     | 0.3646     | 0.0308   | 91.55     |
|                     | 0.3517     | 0.0369   | 89.51     |
|                     | 0.4353     | 0.0311   | 92.86     |
| Sea Wash Blue       | 0.3426     | 0.0252   | 92.64     |
|                     | 0.4904     | 0.0376   | 92.33     |
|                     | 0.3251     | 0.0267   | 91.79     |
| Mirachem 500        | 0.3579     | 0.0603   | 83.15     |
|                     | 0.5035     | 0.0531   | 89.45     |
|                     | 0.3635     | 0.0732   | 79.86     |

Summary:

| <b>Substrates:</b>                 |  | Cold Rolled Steel |             |                                     |               |  |
|------------------------------------|--|-------------------|-------------|-------------------------------------|---------------|--|
| <b>Contaminants:</b>               |  | Oil               |             |                                     |               |  |
| Company Name:                      | Product Name:                            | Conc.:            | Efficiency: | Effective:                          | Observations: |  |
| International Products Corporation | Surface Cleanse Concentrated Neutral 930 | 5                 | 75.32       | <input type="checkbox"/>            |               |  |
| Magnaflux                          | Daraclean 283                            | 5                 | 87.47       | <input checked="" type="checkbox"/> |               |  |
| Oakite Products                    | Inproclean 3800                          | 5                 | 91.31       | <input checked="" type="checkbox"/> |               |  |
| Warren Chemical Company            | Sea Wash Blue                            | 5                 | 92.25       | <input checked="" type="checkbox"/> |               |  |
| Mirachem Corporation               | Mirachem 500                             | 5                 | 84.16       | <input type="checkbox"/>            |               |  |

Conclusion: The three products, Aquavantage 1400, Inproclean 3800 and Sea Wash Blue, will be used on the fifth supplied oil.