

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2000

DateRun: 01/04/2000

Experimenters: Jason Marshall, Nicole Vayo

ClientType: Department of Public Works

ProjectNumber: Project #1

Substrates: Aluminum, Brass, Copper, Nickel, Stainless Steel

PartType: Coupon

Contaminants: Cutting/Tapping Fluids, Greases, Lubricating/Lapping Oils, Oil

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric

Purpose: To evaluate client requested cleaners based on Vendor supplied information.

Experimental Procedure: The cleaners used were diluted to 5% using DI water in 600 ml beakers. Cleaning of the coupons was performed using stir-bar agitation at 130 F for five minutes. Coupons were rinsed using tap water at 120 F for two minutes and dried at room temperature for two hours. Gravimetric analysis was used to determine effectiveness.

SUBSTRATE MATERIAL: Table 1 lists the coupons materials used
Table 1. Substrates

| | |
|-------------------------|-----------------|
| Aluminum | 202-2024 T-3 |
| | 202-7075 T-6 |
| Stainless Steel | 202-410 B-85 |
| Brass | 202-260 |
| Cold Rolled Steel | 202-1020 |

CONTAMINANTS: Table 2 lists the contaminants and their CAS#s
Table 2. Contaminants Used

| Contaminant | CAS # | | | |
|-------------|------------|------------|------------|------------|
| oil | 64741-89-5 | 64742-53-6 | 64741-44-2 | |
| lubricant | 64742-57-0 | 8052-42-4 | 64742-62-7 | 64742-47-8 |
| grease | 64742-47-8 | | | |

CONTAMINATING PROCESS USED: All contaminants were applied to coupons using handheld swabs.

Results: The Mirachem 500 that is kept in-stock at the laboratory was the most effective in removing all three contaminants tested. The Ready-to-Use Mirachem 500 and the Solution 2000 did not perform as well at removing the lubricant. The RTU Mirachem 500 may have already been diluted before testing, thus showing lower results. The lubricant on the coupons cleaned by Solution 2000 was a little thicker due to sitting on the benchtop overnight. The Solution 2000 might have done better using new lubricant. Table 4 lists the cleaning results obtained for the three cleaning solutions and the three contaminants.

Table 4. Cleaning Results

| Company Name | Product Name | Contaminant | CAS # | Efficiency |
|---------------------|--------------------------|-------------|------------|------------|
| Ensolve Biosystems | Grease Feast | oil | 64741-89-5 | 94 |
| | | grease | 64742-47-8 | 100 |
| | | lubricant | 64742-47-8 | 88 |
| United Laboratories | United 2002 Harvest Gold | oil | 64741-89-5 | 66 |
| | | oil | 64742-53-6 | 66 |
| | | oil | 64741-44-2 | 66 |
| | | lubricant | 8052-42-4 | -12 |
| | | lubricant | 64742-57-0 | -12 |

CLEANING LABORATORY EVALUATION SUMMARY

| | | | | |
|---------------------|----------------------|-----------|------------|-----|
| | | lubricant | 64742-62-7 | -12 |
| | | grease | 64742-47-8 | 65 |
| United Laboratories | United 450 All Clear | oil | 64741-89-5 | 95 |
| | | oil | 64742-53-6 | 95 |
| | | oil | 64741-44-2 | 95 |
| | | lubricant | 64742-57-0 | 91 |
| | | lubricant | 8052-42-4 | 91 |
| | | lubricant | 64742-62-7 | 91 |
| | | grease | 64742-47-8 | 100 |

Summary:

| | | | | | |
|------------------------|----------------------|--|--------------------|-------------------------------------|----------------------|
| Substrates: | | Aluminum, Brass, Copper, Nickel, Stainless Steel | | | |
| Contaminants: | | Cutting/Tapping Fluids, Greases, Lubricating/Lapping Oils, Oil | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| EnviroSan Products Ltd | Solution 2000 | 5 | 96.00 | <input checked="" type="checkbox"/> | oil |
| EnviroSan Products Ltd | Solution 2000 | 5 | 43.00 | <input type="checkbox"/> | lubricant |
| EnviroSan Products Ltd | Solution 2000 | 5 | 96.00 | <input checked="" type="checkbox"/> | grease |
| JDI Inc | Mirachem 500 RTU | 5 | 99.00 | <input checked="" type="checkbox"/> | oil |
| JDI Inc | Mirachem 500 RTU | 5 | 76.00 | <input type="checkbox"/> | lubricant |
| JDI Inc | Mirachem 500 RTU | 5 | 94.00 | <input checked="" type="checkbox"/> | grease |
| Mirachem Corporation | Mirachem 500 | 5 | 92.00 | <input checked="" type="checkbox"/> | oil |
| Mirachem Corporation | Mirachem 500 | 5 | 91.00 | <input checked="" type="checkbox"/> | lubricant |
| Mirachem Corporation | Mirachem 500 | 5 | 99.00 | <input checked="" type="checkbox"/> | grease |

Conclusion:

The in-stock Mirachem 500 was the superior product according to the results obtained, because it worked on all three contaminants. The 99% removal of oil and 94% removal of grease indicate the Ready-to-Use Mirachem 500 might be the better product if it is used straight from the spray bottle (to be conducted at a later date). Higher concentrations of Solution 2000 may produce better results.