

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1999

DateRun: 12/14/1999

Experimenters: Jason Marshall, Nicole Vayo

ClientType: Department of Public Works

ProjectNumber: Project #1

Substrates: Aluminum, Brass, Stainless Steel, 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% (except one) using DI water in 600 ml beakers. Cleaning of the coupons was performed using stir-bar agitation at 130 F (except one) 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: Both Ensolve Grease Feast and United Laboratories United 450 All Clear products were effective in removing all three contaminants tested. Grease Feast efficiency ranged from 88-100% and the United 450 removed 91-100%.

The other United Laboratories product, United 2002, had much lower removal of the contaminants. The oil and grease were under 70% removal and the coupons with the lubricant actually gained weight. This could be signified that the product was acting in different manner than the other products. Instead of dissolving the contaminant into solution, the cleaning product was being absorbed into the lubricant, causing swelling, and may eventually lift the contaminant off the coupon. Table 4 lists the cleaning results obtained for the three cleaning solutions and the three contaminants.

Table 4. Cleaning Results

| Company Name | Product Name | Classification | Concentration | Temperature |
|---------------------|--------------------------|------------------|---------------|-------------|
| Ensolve Biosystems | Grease Feast | Alkaline Aqueous | 5 | 130 |
| United Laboratories | United 450 All Clear | Alkaline Aqueous | 5 | 130 |
| United Laboratories | United 2002 Harvest Gold | Solvent | 100 | 72 |

Summary:

CLEANING LABORATORY EVALUATION SUMMARY

| | | | | | |
|-----------------------------------|--|---------------|--------------------|-------------------------------------|----------------------|
| Substrates: | Aluminum, Brass, Stainless Steel, Steel | | | | |
| Contaminants: | Cutting/Tapping Fluids, Greases, Lubricating/Lapping Oils, Oil | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Ensolve Biosystems Inc | Grease Feast Plus | 5 | 94.00 | <input checked="" type="checkbox"/> | oil |
| Ensolve Biosystems Inc | Grease Feast Plus | 5 | 100.00 | <input checked="" type="checkbox"/> | grease |
| Ensolve Biosystems Inc | Grease Feast Plus | 5 | 88.00 | <input checked="" type="checkbox"/> | lubricant |
| United Laboratories International | United 2002 Harvest Gold | 100 | 66.00 | <input type="checkbox"/> | oil |
| United Laboratories International | United 2002 Harvest Gold | 100 | -12.00 | <input type="checkbox"/> | lubricant |
| United Laboratories International | United 2002 Harvest Gold | 100 | 65.00 | <input type="checkbox"/> | grease |
| United Laboratories International | United 450 All Clear | 5 | 95.00 | <input checked="" type="checkbox"/> | oil |
| United Laboratories International | United 450 All Clear | 5 | 91.00 | <input checked="" type="checkbox"/> | lubricant |
| United Laboratories International | United 450 All Clear | 5 | 100.00 | <input checked="" type="checkbox"/> | grease |

Conclusion:

Two of the three products had excellent removal of all the contaminants. Ensolve Grease Feast and United 450 All Clear removed nearly 90% for the oil, grease and lubricant. Even though the third cleaning product had low efficiencies, the results show that the cleaning mechanism may be different than the two aqueous products and could require slightly longer cleaning times.