

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1996
 DateRun: 03/08/1996
 Experimenters: Jay Jankauskas, Sutherland Ramesh
 ClientType: Coatings Manufacturer
 ProjectNumber: Project #1
 Substrates: Stainless Steel
 PartType: Coupon
 Contaminants: Adhesive, Coatings
 Cleaning Methods:
 Analytical Methods: Gravimetric
 Purpose: To determine temperature dependence

Experimental Procedure: The purpose of this trial is to determine the temperature dependence of the two terpene chemistries as compared to NMP.
 Three coupons will be cleaned in 500 ml of each solution at each temperature level (75F, 120F, 160F). Cleaning time will be for thirty minutes, and an acetone rinse will follow. All coupons were prepared and contaminated in the same method as previous experiments.
 Data for cleaning efficiency at 160F will be imported from Phase II results to avoid redundant testing.
 SUBSTRATE MATERIAL: 304 Stainless Steel Coupons
 CONTAMINANTS: Durane Base Coatings #51144
 CONTAMINATING PROCESS USED: Rubbed on with swab and allowed to cure overnight

Results: NMP- Room Temp

| sample # | clean mass (g) | mass with contamination (g) | mass after cleaning (g) | contaminant removed (g) | Percent Removal |
|----------|----------------|-----------------------------|-------------------------|-------------------------|-----------------|
| 19 | 60.2196 | 61.7264 | 60.8123 | 0.9141 | 60.67% |
| 20 | 60.4776 | 62.0680 | 61.0376 | 1.0304 | 64.79% |
| 27 | 60.2424 | 61.4824 | 60.5981 | 0.8843 | 71.31% |
| | | | | 2.8288 | 65.59% |
| | | | | | 5.37% |

Inland Tech EP-921- Room Temp

| sample # | clean mass (g) | mass with contamination (g) | mass after cleaning (g) | contaminant removed (g) | Percent Removal |
|----------|----------------|-----------------------------|-------------------------|-------------------------|-----------------|
| 11 | 60.7079 | 62.2201 | 61.5401 | 0.6800 | 44.97% |
| 12 | 60.2775 | 61.6108 | 60.8862 | 0.7246 | 54.35% |
| 14 | 60.5386 | 62.3071 | 61.7279 | 0.5792 | 32.75% |
| | | | | 1.9838 | 44.02% |
| | | | | | 10.83% |

Terpene Tech HTF85B-Room Temp

| sample # | clean mass (g) | mass with contamination (g) | mass after cleaning (g) | contaminant removed (g) | Percent Removal |
|----------|----------------|-----------------------------|-------------------------|-------------------------|-----------------|
| 6 | 60.4836 | 62.0351 | 61.0971 | 0.9380 | 60.46% |
| 7 | 59.9048 | 61.4770 | 60.4385 | 1.0385 | 66.05% |
| 10 | 60.0137 | 61.6361 | 60.7846 | 0.8515 | 52.48% |
| | | | | 2.828 | 59.67% |
| | | | | | 6.82% |

NMP-120F

CLEANING LABORATORY EVALUATION SUMMARY

| sample # | clean mass (g) | mass with contamination (g) | mass after cleaning (g) | contaminant removed (g) | Percent Removal |
|----------|----------------|-----------------------------|-------------------------|-------------------------|-----------------|
| 21 | 60.2213 | 61.9631 | 60.8190 | 1.1441 | 65.68% |
| 22 | 60.0081 | 61.6345 | 60.2803 | 1.3542 | 83.26% |
| 23 | 60.1057 | 61.5124 | 60.1346 | 1.3778 | 97.95% |
| | | | | 3.8761 | 82.30% |
| | | | | | 16.15% |

Terpene Tech. HTF85B: 120F

| sample # | clean mass (g) | mass with contamination (g) | mass after cleaning (g) | contaminant removed (g) | Percent Removal |
|----------|----------------|-----------------------------|-------------------------|-------------------------|-----------------|
| 16 | 60.5752 | 62.4356 | 60.6127 | 1.8229 | 97.98% |
| 25 | 60.5201 | 62.1252 | 60.6090 | 1.5162 | 94.46% |
| 28 | 59.9508 | 61.3642 | 59.9562 | 1.408 | 99.62% |
| | | | | 4.7471 | 97.35% |
| | | | | | 2.64% |

Inland Tech EP-921-120 F

| sample # | clean mass (g) | mass with contamination (g) | mass after cleaning (g) | contaminant removed (g) | Percent Removal |
|----------|----------------|-----------------------------|-------------------------|-------------------------|-----------------|
| 8 | 60.1098 | 61.4076 | 60.3152 | 1.0924 | 84.17% |
| 24 | 60.2288 | 61.8040 | 60.6116 | 1.1924 | 75.70% |
| 26 | 59.3009 | 60.6873 | 59.5260 | 1.1613 | 83.76% |
| | | | | 3.4461 | 81.21% |
| | | | | | 4.78% |

Summary:

| | | | | | |
|-------------------------|----------------------|--------------------|--------------------|-------------------------------------|----------------------|
| Substrates: | | Stainless Steel | | | |
| Contaminants: | | Adhesive, Coatings | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| ISP Technologies | N Methyl Pyrrolidone | 100 | 65.69 | <input type="checkbox"/> | |
| Inland Technologies Inc | EP 921 | 100 | 81.21 | <input checked="" type="checkbox"/> | |
| Tarksol Inc | Tarksol HTF 85 B | 100 | 97.35 | <input checked="" type="checkbox"/> | |

Conclusion: