

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2003
DateRun: 06/04/2003
Experimenters: Jason Marshall
ClientType: Printing Company
ProjectNumber: Project #1
Substrates: Stainless Steel
PartType: Coupon
Contaminants: Inks
Cleaning Methods: Immersion/Soak
Analytical Methods: Gravimetric

Purpose: To evaluate cleaners on second supplied ink.

Experimental Procedure: Six products were selected from the previous trial and the SSL's databases based on client supplied information. Even though the substrate to be cleaned was designated as a textile (cloth t-shirts) the initial testing was conducted on a metal substrate so that a quantitative assessment could be made on the selected cleaners. Four of the cleaners were used at full strength, one was used at 20% as recommended by the vendor and the last one was diluted to 10%. The dilutions were made using DI water. All six products were poured into 600 ml glass beakers. All solutions were used at room temperature.

Eighteen preweighed stainless steel coupons were coated with one of the supplied inks, PolysOne Kennesaw Wiflex MX Mixing Colors -blue (85-68-7, 9002-86-2) using a hand held swab and allowed to dry. After drying, coupons were weighed again to determine the amount of ink applied to each coupon. Three coupons were immersed into each solution and cleaned for five minutes using stir-bar agitation. Coupons were rinsed in tap water at 120 F for 15 seconds and dried using a Master Appliance Heat Gun at 500 F for 1 minute. When coupons cooled to room temperature, final weights were measured and product efficiencies were calculated.

Results: Bio T Max and D-Limonene removed over 80% of the blue ink using immersion cleaning only. The other four products had vast improvement when wiped three times with a paper towel. Of the four, only one did not remove over 90% of the ink. The table below lists the amount of ink added and removed after each cleaning process.

| Cleaner | Initial wt | Final wt | % Removed |
|-----------------------|------------|----------|-----------|
| Bio T Max | 0.3850 | 0.0083 | 97.84 |
| | 0.2028 | 0.0060 | 97.04 |
| | 0.1178 | 0.0060 | 94.91 |
| Graffiti Remover | 0.1721 | 0.4891 | -184.20 |
| | 0.3962 | 0.6827 | -72.31 |
| | 0.2112 | 0.4958 | -134.75 |
| D-Limonene | 0.1153 | 0.0450 | 60.97 |
| | 0.1496 | 0.0124 | 91.71 |
| | 0.3151 | 0.0199 | 93.68 |
| Soy Clear 1500 | 0.2428 | 0.0684 | 71.83 |
| | 0.1409 | 0.0978 | 30.59 |
| | 0.1238 | 0.1279 | -3.31 |
| USA Wash | 0.2694 | 0.2895 | -7.46 |
| | 0.2340 | 0.2489 | -6.37 |
| | 0.2610 | 0.2776 | -6.36 |
| Valtron SP 2201 | 0.3170 | 0.3064 | 3.34 |
| | 0.2412 | 0.2289 | 5.10 |
| | 0.1793 | 0.1708 | 4.74 |
| Wipe-Graffiti Remover | 0.1721 | 0.0853 | 50.44 |
| | 0.3962 | 0.2184 | 44.88 |
| | 0.2112 | 0.0792 | 62.50 |
| Wipe-Soy Clear 1500 | 0.2428 | 0.0039 | 98.39 |
| | 0.1409 | 0.0048 | 96.59 |

CLEANING LABORATORY EVALUATION SUMMARY

| | | | |
|----------------------|--------|--------|-------|
| | 0.1238 | 0.0040 | 96.77 |
| Wipe-USA Wash | 0.2694 | 0.0029 | 98.92 |
| | 0.2340 | 0.0022 | 99.06 |
| | 0.2610 | 0.0043 | 98.35 |
| Wipe-Valtron SP 2201 | 0.3170 | 0.0662 | 79.12 |
| | 0.2412 | 0.0026 | 98.92 |
| | 0.1793 | 0.0030 | 98.33 |

Summary:

| | | | | | | |
|---------------------------|----------------------|-----------------|--------------------|-------------------------------------|----------------------|--|
| Substrates: | | Stainless Steel | | | | |
| Contaminants: | | Inks | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: | |
| Bio Chem Systems | Bio T Max | 100 | 96.60 | <input checked="" type="checkbox"/> | | |
| Twin Rivers Technologies | Graffiti Remover | 100 | -130.00 | <input type="checkbox"/> | | |
| Florida Chemical Company | D-Limonene | 100 | 82.12 | <input checked="" type="checkbox"/> | | |
| AG Environmental Products | Soy Clear 1500 | 100 | 33.04 | <input type="checkbox"/> | | |
| Nensco | USA Wash | 20 | -6.70 | <input type="checkbox"/> | | |
| Valtech Corporation | Valtron SP 2201 | 10 | 4.39 | <input type="checkbox"/> | | |
| Twin Rivers Technologies | Graffiti Remover | 100 | 52.60 | <input type="checkbox"/> | Wipe | |
| AG Environmental Products | Soy Clear 1500 | 100 | 97.25 | <input checked="" type="checkbox"/> | Wipe | |
| Nensco | USA Wash | 20 | 98.78 | <input checked="" type="checkbox"/> | Wipe | |
| Valtech Corporation | Valtron SP 2201 | 10 | 92.12 | <input checked="" type="checkbox"/> | Wipe | |

Conclusion:

The successful cleaners will be evaluated on the next supplied ink.