

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2000
 DateRun: 02/23/2000
 Experimenters: Jason Marshall
 ClientType: Mfr Boating Accessories
 ProjectNumber: Project #1
 Substrates: Stainless Steel
 PartType: Coupon
 Contaminants: Inks
 Cleaning Methods: Immersion/Soak
 Analytical Methods: Gravimetric

Purpose: To further evaluate selected cleaners for the removal of inks.

Experimental Procedure: Three cleaners were selected from the previous trial. The aqueous products was diluted with DI water to 20% in a 600 ml beaker. One of the semi-aqueous products was diluted to 50% and the other was used at full strength. Three sets of nine preweighed coupons were coated with one of the supplied inks and weighed again. Three coupons of each color were cleaned in each solution for five minutes with no agitation. After cleaning the coupons were rinsed for 15 second in tap water at 120F. After rinsing, each coupon was wiped twice using a fresh paper towel. Following the drying, final clean weights were recorded and efficiencies were calculated.

SUBSTRATE MATERIAL: Stainless Steel Coupons SS-302 B86

CONTAMINANTS: Inks-EMMCorp Thermosetting Inks of ER Series, Blue, Gold, Red

CONTAMINATING PROCESS USED: Coupons were coated with inks using a hand held swab.

Results: SWR One was the only solution that had moderate removal of each of the three inks. During the cleaning, the color of SWR turned from its normal color of pink to which ever color it was attempting to clean (blue, gold, red). The other two solutions did not show the same dissolving action as SWR One. Inproclean had higher cleaning efficiencies than the Bio T Max. Table 2 lists the calculated results for each cleaner and ink colors.

Table 2. Cleaning Efficiencies

| Cleaner | Inproclean 4000 T | | | Bio T Max | | | SWR One | | |
|----------|--------------------------------|-------|-------|--------------------------------|-------|-------|-----------------------|-------|-------|
| Ink | Blue | Gold | Red | Blue | Gold | Red | Blue | Gold | Red |
| Coupon 1 | 48.03 | 15.22 | 54.84 | 50.22 | 29.69 | 54.15 | 51.43 | 62.61 | 84.86 |
| Coupon 2 | 55.41 | 20.25 | 52.56 | 29.17 | 15.62 | 49.27 | 58.82 | 59.33 | 84.30 |
| Coupon 3 | 73.21 | 14.44 | 60.64 | 51.96 | 10.14 | 47.91 | 60.86 | 75.18 | 78.35 |
| Average | 58.88 | 16.64 | 56.02 | 43.79 | 18.49 | 50.44 | 57.04 | 65.70 | 82.50 |
| | No visible signs of dissolving | | | No visible signs of dissolving | | | Dissolved inks easily | | |

Summary:

| | | | | | |
|----------------------|----------------------|-----------------|--------------------|-------------------------------------|----------------------|
| Substrates: | | Stainless Steel | | | |
| Contaminants: | | Inks | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Oakite Products | Inproclean 4000 T | 50 | 58.88 | <input type="checkbox"/> | |
| Bio Chem Systems | Bio T Max | 100 | 50.44 | <input type="checkbox"/> | |
| SWR Corporation | SWR One | 25 | 82.50 | <input checked="" type="checkbox"/> | |

Conclusion: These three cleaners will be used once again for an additional experiment to imitate the cleaning procedure actually used for the removal of ink cleaning. Solutions will be used along with a more rigorous wipe cleaning.