

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2008  
 DateRun: 03/28/2008  
 Experimenters: Jason Marshall, Shweta Bansal  
 ClientType: Machining Company  
 ProjectNumber: Project #1  
 Substrates: Aluminum  
 PartType: Coupon  
 Contaminants: Inks  
 Cleaning Methods: Manual Wipe  
 Analytical Methods: Gravimetric, Timing  
 Purpose: To evaluate top ten products on fifth supplied ink

Experimental Procedure: The top ten successful products from the previous trial were used at full strength and room temperature. Twenty preweighed coupons were coated with the supplied Sakura Coatings Product Company Solid Marker (yellow). Once dry, a second weight was recorded to determine the amount of ink added to the coupon. As in the last trial, two coupons were used per cleaning alternative. A handheld swab was immersed into the cleaning product and then manual wiped across the coupon for up to one minute. Following the cleaning, the coupons was wiped dry for 5 seconds. Observations were made, final coupon weights recorded, and the average efficiencies were calculated.

Results: Six of the ten products removed nearly all of the yellow ink from the aluminum coupons in under 60 seconds of manual wiping. The table below lists the amount of ink applied, the amount remaining, the efficiency and the time needed to clean the ink.

| Cleaner                                | Initial wt | Final wt | % Removed | Time |
|--|------------|----------|-----------|------|
| Soy Clear 1500                         | 0.1030     | 0.0399   | 61.26     | >60  |
|  | 0.0840     | 0.0412   | 50.95     |      |
| Ink Zapper                             | 0.0729     | 0.0036   | 95.06     | 60   |
|  | 0.0988     | 0.0057   | 94.23     |      |
| Methyl Ester 1618                      | 0.0903     | 0.0607   | 32.78     | >60  |
|  | 0.1385     | 0.0753   | 45.63     |      |
| Citrus Soy Solvent Cleaner & Degreaser | 0.0631     | 0.0497   | 21.24     | >60  |
|  | 0.1528     | 0.0860   | 43.72     |      |
| Graffiti Remover SAC                   | 0.1264     | 0.0053   | 95.81     | 60   |
|  | 0.1077     | 0.0086   | 92.01     |      |
| BioRenewables Industrial Degreaser     | 0.1112     | 0.0684   | 38.49     | >60  |
|  | 0.1061     | 0.0704   | 33.65     |      |
| EP 921                                 | 0.1071     | 0.0054   | 94.96     | 45   |
|  | 0.0818     | 0.0038   | 95.35     |      |
| BG Solv 717 Ink & Graffiti Cleaner     | 0.0578     | 0.0052   | 91.00     | 20   |
|  | 0.0725     | 0.0011   | 98.48     |      |
| Graffiti remover                       | 0.0801     | 0.0021   | 97.38     | 25   |
|  | 0.0783     | 0.0024   | 96.93     |      |
| Smart Solve 605                        | 0.0714     | 0.0040   | 94.40     | 60   |
|  | 0.1008     | 0.0128   | 87.30     |      |

Summary:

|                           |                      |               |                    |                          |                      |
|---------------------------|----------------------|---------------|--------------------|--------------------------|----------------------|
| <b>Substrates:</b>        | Aluminum             |               |                    |                          |                      |
| <b>Contaminants:</b>      | Inks                 |               |                    |                          |                      |
| <b>Company Name:</b>      | <b>Product Name:</b> | <b>Conc.:</b> | <b>Efficiency:</b> | <b>Effective:</b>        | <b>Observations:</b> |
| AG Environmental Products | Soy Clear 1500       | 100           | 56.11              | <input type="checkbox"/> |                      |

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|                                   |  |     |       |                                     |  |
|-----------------------------------|--|-----|-------|-------------------------------------|--|
| Vertec BioSolvents                | Ink Zapper                             | 100 | 94.65 | <input checked="" type="checkbox"/> |  |
| Twin Rivers Technologies          | Methyl Ester 1618                      | 100 | 39.21 | <input type="checkbox"/>            |  |
| Bi-O-Kleen Industries             | Citrus Soy Solvent Cleaner & Degreaser | 100 | 32.48 | <input type="checkbox"/>            |  |
| Spartan Chemical Company          | Graffiti Remover SAC                   | 100 | 93.91 | <input checked="" type="checkbox"/> |  |
| Spartan Chemical Company          | BioRenewables - Restroom Cleaner       | 100 | 36.07 | <input type="checkbox"/>            |  |
| Inland Technologies Inc           | EP 921                                 | 100 | 95.16 | <input checked="" type="checkbox"/> |  |
| BioGenesis Enterprises Inc        | BG Solv 717 Ink & Graffiti Cleaner     | 100 | 94.74 | <input checked="" type="checkbox"/> |  |
| Finger Lakes Chemical             | Graffiti remover                       | 100 | 97.16 | <input checked="" type="checkbox"/> |  |
| United Laboratories International | Smart Solve 605                        | 100 | 90.85 | <input checked="" type="checkbox"/> |  |

Conclusion: The same set of products will be used on the last supplied ink.