

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2009  
DateRun: 01/15/2009  
Experimenters: Jason Marshall, Daniel Pina  
ClientType: Wire & Cable Mfr  
ProjectNumber: Project #2  
Substrates: Galvanized Steel  
PartType: Coupon  
Contaminants: Inks  
Cleaning Methods: Manual Wipe  
Analytical Methods: Gravimetric

Purpose: To evaluate products on ink removal from galvanized steel using manual wiping.

Experimental Procedure: Seven products that were previously tested for client were based on performance. Each product was used at full strength and room temperature. Twenty-one preweighed galvanized steel coupons were coated with the supplied blue ink and allowed to dry. A second weighing was performed to determine the amount of ink added. Three coupons were placed into a Gardner Straight Line Washability unit. A 2-3 mL was applied to the coupons using a squeeze bulb. A Kimberly Clark Wypall X60 reinforced wiper was placed into the cleaning sled and also soaked with the cleaning solution. The machine was run for 30 seconds (~20 cycles), blotted dry with a fresh towel and weighed a final time to determine the effectiveness after 30 seconds. A second 30 second cleaning process was performed on the coupons to determine effectiveness after one minute of cleaning.

Results: Cleaning after 30 seconds had limited to moderate success for the seven products tested.

| Cleaner              | Initial wt | Final wt | % Removed |
|----------------------|------------|----------|-----------|
| DBE 6                |            |          |           |
|                      | 0.0471     | 0.0293   | 37.79     |
|                      | 0.0457     | 0.0301   | 34.14     |
|                      | 0.0648     | 0.0350   | 45.99     |
| Soy Gold 1100        |            |          |           |
|                      | 0.0461     | 0.0458   | 0.65      |
|                      | 0.0304     | 0.0300   | 1.32      |
|                      | 0.0585     | 0.0181   | 69.06     |
| Shopmaster RC        |            |          |           |
|                      | 0.0451     | 0.0199   | 55.88     |
|                      | 0.0392     | 0.0136   | 65.31     |
|                      | 0.0525     | 0.0095   | 81.9      |
| SC Soyester          |            |          |           |
|                      | 0.0569     | 0.0203   | 64.32     |
|                      | 0.0448     | 0.0167   | 62.72     |
|                      | 0.0378     | 0.0263   | 30.42     |
| Graffiti Remover SAC |            |          |           |
|                      | 0.0624     | 0.0292   | 53.21     |
|                      | 0.0549     | 0.0190   | 65.39     |
|                      | 0.0461     | 0.0190   | 58.79     |
| Smart Solve 605      |            |          |           |
|                      | 0.0528     | 0.0421   | 20.27     |
|                      | 0.0430     | 0.0246   | 42.79     |
|                      | 0.0532     | 0.0328   | 38.35     |
| Bean e Doo           |            |          |           |
|                      | 0.0506     | 0.0316   | 37.55     |
|                      | 0.0422     | 0.039    | 7.58      |
|                      | 0.0400     | 0.0321   | 19.75     |

# CLEANING LABORATORY EVALUATION SUMMARY

The additional 30 seconds improved efficiencies by 5-30% for the various products. The overall efficiencies were calculated for the full one minute of cleaning. The final removal rates were based on the data in the next table.

| Cleaner              | Initial wt | Final wt | % Removed |
|----------------------|------------|----------|-----------|
| DBE 6                |            |          |           |
|                      | 0.0471     | 0.0224   | 52.44     |
|                      | 0.0457     | 0.0250   | 45.30     |
|                      | 0.0648     | 0.0237   | 63.43     |
| Soy Gold 1100        |            |          |           |
|                      | 0.0461     | 0.0448   | 2.82      |
|                      | 0.0304     | 0.0226   | 25.66     |
|                      | 0.0585     | 0.0164   | 71.97     |
| Shopmaster RC        |            |          |           |
|                      | 0.0451     | 0.0104   | 76.94     |
|                      | 0.0392     | 0.0065   | 83.42     |
|                      | 0.0525     | 0.0042   | 92.00     |
| SC Soyester          |            |          |           |
|                      | 0.0569     | 0.0138   | 75.75     |
|                      | 0.0448     | 0.0134   | 70.09     |
|                      | 0.0378     | 0.0259   | 31.48     |
| Graffiti Remover SAC |            |          |           |
|                      | 0.0624     | 0.0054   | 91.35     |
|                      | 0.0549     | 0.0053   | 90.35     |
|                      | 0.0461     | 0.0021   | 95.44     |
| Smart Solve 605      |            |          |           |
|                      | 0.0528     | 0.0259   | 50.95     |
|                      | 0.0430     | 0.0116   | 73.02     |
|                      | 0.0532     | 0.0219   | 58.83     |
| Bean e Doo           |            |          |           |
|                      | 0.0506     | 0.0184   | 63.64     |
|                      | 0.0422     | 0.0324   | 23.22     |
|                      | 0.0400     | 0.0243   | 39.25     |

Summary:

| <b>Substrates:</b>                | Galvanized Steel                  |        |             |                                     |               |
|-----------------------------------|-----------------------------------|--------|-------------|-------------------------------------|---------------|
| <b>Contaminants:</b>              | Inks                              |        |             |                                     |               |
| Company Name:                     | Product Name:                     | Conc.: | Efficiency: | Effective:                          | Observations: |
| Invista S.a.r.l                   | Flexisolv DBE 6 ester             | 100    | 53.72       | <input checked="" type="checkbox"/> |               |
| AG Environmental Products         | Soy Gold 1000                     | 100    | 33.48       | <input type="checkbox"/>            |               |
| Buckeye International             | Shopmaster RC                     | 100    | 84.12       | <input checked="" type="checkbox"/> |               |
| Gemtek Products                   | SC Soyester                       | 100    | 59.11       | <input checked="" type="checkbox"/> |               |
| Spartan Chemical Company          | Graffiti Remover SAC              | 100    | 92.38       | <input checked="" type="checkbox"/> |               |
| United Laboratories International | Smart Solve 605                   | 100    | 60.93       | <input checked="" type="checkbox"/> |               |
| Franmar Chemical                  | Bean-e-doo (Parts Washer Solvent) | 100    | 42.03       | <input type="checkbox"/>            |               |

Conclusion:

The effective products will be evaluated on the supplied galvanized steel wire housing with ink markings.