

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2009

DateRun: 11/03/2009

Experimenters: Junhee Cho, Johnny Le

ClientType: Ceramic Coating Company

ProjectNumber: Project #2

Substrates: Aluminum

PartType: Coupon

Contaminants: Oil

Cleaning Methods: Manual Wipe

Analytical Methods: Gravimetric

Purpose: To evaluate top five products on fourth supplied contaminant using manual cleaning

Experimental Procedure: Five products from the previous trials were selected based on performance. All were used at room temperature. Two alkaline aqueous cleaners were diluted to 5% using DI water in 300 ml beakers. Three cleaners were used at full strength. Fifteen preweighed aluminum coupons were coated with Mobile DTE 25 oil using a handheld swab. The contaminated coupons were weighed again to determine the amount of soil added.

Each cleaner tested with three coupons. Three coupons were placed into a Gardner Straight Line Washability unit. A Kimberly Clark Reinforced paper towel was attached to the cleaning sled and soaked with 5-7 sprays of cleaning solutions. Each coupon was sprayed 3 times with the same cleaning solution. First, Coupon was cleaned for 15 cycles two times; after coupon was cleaned for 15 cycles, experimenter changed the paper towel and soaked with 5 spray of same cleaning solution. At the end of the cleaning, coupons were dried at room temperature naturally. Final weights were recorded and efficiencies were calculated and recorded.

Results: Four of the products removed more than 90% of the oil from the aluminum coupons using simulated manual cleaning. The fifth removed less than 80%. The table lists the amount of soil added, the amount remaining and the efficiency for each coupon cleaned.

| Cleaner                      | Initial wt | Final wt | % Removed |
|------------------------------|------------|----------|-----------|
| Shopmaster RC 100%           |            |          |           |
|                              | 0.0428     | 0.0129   | 69.86     |
|                              | 0.0439     | 0.0085   | 80.64     |
|                              | 0.0346     | 0.0091   | 73.70     |
| SC Aircraft metal cleaner 5% |            |          |           |
|                              | 0.0178     | 0.0010   | 94.38     |
|                              | 0.0165     | 0.0026   | 84.24     |
|                              | 0.0199     | 0.0008   | 95.98     |
| Solsafe 245 100%             |            |          |           |
|                              | 0.0302     | 0.0021   | 93.05     |
|                              | 0.0295     | 0.0022   | 92.54     |
|                              | 0.0211     | 0.0014   | 93.36     |
| Detergent 8 5%               |            |          |           |
|                              | 0.0151     | 0.0016   | 89.40     |
|                              | 0.0148     | 0.0009   | 93.92     |
|                              | 0.0179     | 0.0015   | 91.62     |
| Activion                     |            |          |           |
|                              | 0.0421     | 0.0022   | 94.77     |
|                              | 0.0290     | 0.0008   | 97.24     |
|                              | 0.0341     | 0.0019   | 94.43     |

Summary:

|                       |                      |               |                    |                          |                      |
|-----------------------|----------------------|---------------|--------------------|--------------------------|----------------------|
| <b>Substrates:</b>    | Aluminum             |               |                    |                          |                      |
| <b>Contaminants:</b>  | Oil                  |               |                    |                          |                      |
| <b>Company Name:</b>  | <b>Product Name:</b> | <b>Conc.:</b> | <b>Efficiency:</b> | <b>Effective:</b>        | <b>Observations:</b> |
| Buckeye International | Shopmaster RC        | 100           | 74.73              | <input type="checkbox"/> |                      |

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|                                     |  |     |       |                                     |  |
|-------------------------------------|--|-----|-------|-------------------------------------|--|
| Gemtek Products                     | SC Aircraft & Metal Cleaner<br>Super Concentrate | 5   | 91.53 | <input checked="" type="checkbox"/> |  |
| Bio Chem Systems                    | Solsafe 245                                      | 100 | 92.98 | <input checked="" type="checkbox"/> |  |
| Alconox Inc                         | Detergent 8                                      | 5   | 91.65 | <input checked="" type="checkbox"/> |  |
| Activeion Cleaning<br>Solutions LLC | Activeion Pro                                    | 100 | 95.48 | <input checked="" type="checkbox"/> |  |

Conclusion:

Based on past performance on the previous four contaminants, all five products will be tested on the fifth supplied contaminant under the same conditions.