

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2000  
 DateRun: 10/10/2000  
 Experimenters: Jason Marshall, John Brunelle  
 ClientType: Cleaner Manufacturer  
 ProjectNumber: Project #1  
 Substrates: Aluminum, Stainless Steel  
 PartType: Coupon  
 Contaminants: Cutting/Tapping Fluids, Fluxes, Greases, Lubricating/Lapping Oils, Oil  
 Cleaning Methods: Immersion/Soak  
 Analytical Methods: Gravimetric  
 Purpose: To evaluate the effectiveness of client selected cleaners.

Experimental Procedure: All the products were used at full strength in 600 ml beakers. The solutions were heated to 105 F on a hot plate. Prew weighed coupons were coated with the listed contaminants and weighed again. Three coupons with one contaminant were submersed into a beaker agitated with a magnetic stir bar. Cleaning lasted for 5 minutes followed by a tap water rinse at 120 F for 30 seconds and finally allowed to dry overnight at room temperature. Final clean weights were measured and cleaning effectiveness was calculated.

SUBSTRATE MATERIAL: The surface materials used are listed in Table 1.

Substrate Code ID#  
 aluminum AL 202-5086 H-32  
 stainless st SS 202-17-4 HR-68

CONTAMINANTS: The contaminants tested are listed in Table 2.

Table 2. Contaminants Used  
 Contaminant Code CAS#  
 flux, Ersin 5831 RMA FX 67-56-1, 8050-09-7, 67-63-0  
 lubricant, 423 LU 64742-47-8  
 oil, Tap Magic cutting OI 112-62-9  
 grease, ksl-111 GR 64742-57-0, 64742-62-7, 8052-42-4

Results: Two of the products, SW 1 and SW3, removed over 80% of the oil applied to the coupons. One product, SW3, was successful in removing the grease and lubricant. The coupons with the lubricant showed cleaning in excess of 100%. This increased efficiency could be due to a couple of things, coupon damage (etching) or dirty precleaned coupons. The dirty baseline coupons appears to be the cause of the elevated results. Table 4, 5 and 6 lists the results for each cleaner.

Table 4. Ozzy Juice SW 1 Results

|            |                     |       |       |       |
|------------|---------------------|-------|-------|-------|
| Company    | Chem Free Corp      |       |       |       |
| Product    | Ozzy Juice SW1      |       |       |       |
| Classif.   | enzymatic microbial |       |       |       |
| Subst/Cont | AL-FX               | AL-LU | SS-OI | SS-GR |
| Coupon 1   | 20.11               | 15.91 | 89.5  | 55.88 |
| Coupon 2   | 21.14               | 20.00 | 83.42 | 85.71 |
| Coupon 3   | 23.63               | 4.76  | 72.55 | 63.33 |
| Average    | 21.63               | 13.56 | 81.82 | 68.31 |

Table 5. Heavy Grease Formula Results

|            |                          |        |       |       |
|------------|--------------------------|--------|-------|-------|
| Company    | Chem Free Corp           |        |       |       |
| Product    | Heavy Grease Formula SW2 |        |       |       |
| Classif.   | enzymatic microbial      |        |       |       |
| Subst/Cont | AL-FX                    | AL-LU  | SS-OI | SS-GR |
| Coupon 1   | 22.00                    | 11.11  | 40.00 | 56.60 |
| Coupon 2   | 19.19                    | 0.00   | 46.09 | 79.45 |
| Coupon 3   | 18.32                    | -16.22 | 75.17 | 72.84 |
| Average    | 19.84                    | -1.7   | 53.75 | 69.63 |

Table 6. Ozzy Juice SW3 Results

|          |                     |  |  |  |
|----------|---------------------|--|--|--|
| Company  | Chem Free Corp      |  |  |  |
| Product  | Ozzy Juice SW3      |  |  |  |
| Classif. | enzymatic microbial |  |  |  |

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| Subst/Cont | AL-FX | AL-LU  | SS-OI | SS-GR |
|------------|-------|--------|-------|-------|
| Coupon 1   | 14.69 | 188.24 | 93.18 | 88.24 |
| Coupon 2   | 13.20 | 111.11 | 88.14 | 94.59 |
| Coupon 3   | 13.93 | 141.18 | 86.83 | 86.24 |
| Average    | 13.94 | 146.84 | 89.38 | 89.69 |

Summary:

|                       |                                     |  |                    |                                     |                      |
|-----------------------|-------------------------------------|--|--------------------|-------------------------------------|----------------------|
| <b>Substrates:</b>    |                                     | Aluminum, Stainless Steel  |                    |                                     |                      |
| <b>Contaminants:</b>  |                                     | Cutting/Tapping Fluids, Fluxes, Greases, Lubricating/Lapping Oils, Oil |                    |                                     |                      |
| <b>Company Name:</b>  | <b>Product Name:</b>                | <b>Conc.:</b>  | <b>Efficiency:</b> | <b>Effective:</b>                   | <b>Observations:</b> |
| Chem Free Corporation | SW-1 Ozzy Juice                     | 100  | 21.63              | <input type="checkbox"/>            | flux                 |
| Chem Free Corporation | SW-1 Ozzy Juice                     | 100  | 13.56              | <input type="checkbox"/>            | Lubricant            |
| Chem Free Corporation | SW-1 Ozzy Juice                     | 100  | 81.82              | <input checked="" type="checkbox"/> | oil                  |
| Chem Free Corporation | SW-1 Ozzy Juice                     | 100  | 68.31              | <input type="checkbox"/>            | grease               |
| Chem Free Corporation | SW-2 Heavy Grease Formula           | 100  | 19.84              | <input type="checkbox"/>            | flux                 |
| Chem Free Corporation | SW-2 Heavy Grease Formula           | 100  | -1.70              | <input type="checkbox"/>            | lubricant            |
| Chem Free Corporation | SW-2 Heavy Grease Formula           | 100  | 83.75              | <input type="checkbox"/>            | oil                  |
| Chem Free Corporation | SW-2 Heavy Grease Formula           | 100  | 69.63              | <input type="checkbox"/>            | grease               |
| Chem Free Corporation | SW-3 Ozzy Juice (Improved Low Odor) | 100  | 13.94              | <input type="checkbox"/>            | flux                 |
| Chem Free Corporation | SW-3 Ozzy Juice (Improved Low Odor) | 100  | 146.84             | <input type="checkbox"/>            | lubricant            |
| Chem Free Corporation | SW-3 Ozzy Juice (Improved Low Odor) | 100  | 89.38              | <input checked="" type="checkbox"/> | oil                  |
| Chem Free Corporation | SW-3 Ozzy Juice (Improved Low Odor) | 100  | 89.69              | <input checked="" type="checkbox"/> | grease               |

Conclusion:

Ozzy Juice SW3 was the most successful cleaner evaluated in this trial. An additional test will be conducted to determine the compatibility of SW3 with aluminum.