

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1995  
 DateRun: 07/06/1995  
 Experimenters: Donald Garlotta, Jay Jankauskas  
 ClientType: Plating Job Shop  
 ProjectNumber: Project #1  
 Substrates: Aluminum, Brass, Carbon Steel, Copper  
 PartType: Coupon  
 Contaminants: Cutting/Tapping Fluids, Lubricating/Lapping Oils, Waxes, Oil  
 Cleaning Methods: Mechanical Agitation  
 Analytical Methods: Black light, FTIR, Gravimetric  
 Purpose: Test out the two new Oakite products

Experimental Procedure: The Inproclean #2000 is a no foaming version of the Inproclean #3800. The Inproclean 61B is a powdered aluminum and steel cleaner. The Inproclean #2000 will be used at 10% by volume concentration while 20 grams of Inproclean 61B will be dissolved in 500 ml of water. Cleaning will take place at 150 F for 20 minutes. The coupons will then be rinsed for 2 minutes in 150 F tap water and dried under air knives for 2 minutes and dried in a convection oven set at 120 F for one hour. Gravimetric analysis will be used to estimate the removal of all four contaminants. The coupons will be observed under a black light to notice any residual wax or quench oil. FTIR will be used to notice any non-visible traces of waxes or oils.

SUBSTRATE MATERIAL: #1- 6061 Aluminum coupons, #2- 110 Copper Coupons, #3- 260 Brass Coupons, #4 Carbon Steel pieces  
 CONTAMINANTS: #1- Wax, #2- Tap magic cutting fluid, #3- SafeTap grinding lubricant, #4- CI Hayes Quench Oil  
 CONTAMINATING PROCESS USED: coupons were dipped in wax and the oils were applied with a swab.

Results: Absolutely no foam, and very good wax and oil rejection. There was no etching on any of the coupons. As in all previous trials there is a slight bit of wax remaining on the coupons. Visually, all the oils were removed but a slight bit of Safetap was detected by the FTIR. Definitely need more mechanical energy to remove the wax residue. Increased air agitation with brushing should accomplish this. Probably one of the best wax removers, but the Inproclean 61B foams up quite a bit and it etches the brass pretty bad, shouldn't be considered by Plating Job Shop.

## EXPERIMENTAL DATA LOG

### GRAVIMETRIC ANALYSIS

| Sample # and substrate | clean mass (g) | mass with contamination (g) | mass after cleaning (g) | contaminant removed (g) | Percent Removal |
|------------------------|----------------|-----------------------------|-------------------------|-------------------------|-----------------|
| #4-Al                  | 20.9807        | 21.7228                     | 21.0077                 | 0.7151                  | 96.36%          |
| #10-Al                 | 20.9982        | 21.7389                     | 21.0008                 | 0.7381                  | 99.65%          |
| #3545-Cu               | 35.3483        | 36.0925                     | 35.3498                 | 0.7427                  | 99.80%          |
| #4076-Cu               | 35.4014        | 36.2451                     | 35.4019                 | 0.8432                  | 99.94%          |
| #4687-Br               | 34.4644        | 35.2208                     | 34.4650                 | 0.7558                  | 99.92%          |
| #4080-Br               | 34.4050        | 35.1950                     | 34.4066                 | 0.7884                  | 99.80%          |
| #23-Steel              | 128.7159       | 129.8784                    | 128.7243                | 1.1541                  | 99.28%          |
| #69-Steel              | 152.9184       | 154.2190                    | 152.9235                | 1.2955                  | 99.61%          |
| #18-Al                 | 21.0125        | 22.4750                     | 21.0126                 | 1.4624                  | 99.99%          |
| #26-Al                 | 21.0039        | 22.3597                     | 21.0040                 | 1.3557                  | 99.99%          |
| #5581-Cu               | 35.5524        | 36.5757                     | 35.5524                 | 1.0233                  | 100.00%         |
| #4509-Cu               | 35.4532        | 36.2085                     | 35.4527                 | 0.7558                  | 100.07%         |

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|           |          |          |          |        |         |
|-----------|----------|----------|----------|--------|---------|
| #5054-Br  | 34.4965  | 35.4915  | 34.4968  | 0.9947 | 99.97%  |
| #4459-Br  | 34.4373  | 35.3729  | 34.4364  | 0.9365 | 100.10% |
| #37-Steel | 176.2809 | 178.4399 | 176.2828 | 2.1571 | 99.91%  |
| #53-Steel | 132.4426 | 133.8878 | 132.4431 | 1.4447 | 99.97%  |

Summary:

|                      |                      |  |                    |                                     |                      |
|----------------------|----------------------|--|--------------------|-------------------------------------|----------------------|
| <b>Substrates:</b>   |                      | Aluminum, Brass, Carbon Steel, Copper                        |                    |                                     |                      |
| <b>Contaminants:</b> |                      | Cutting/Tapping Fluids, Lubricating/Lapping Oils, Waxes, Oil |                    |                                     |                      |
| <b>Company Name:</b> | <b>Product Name:</b> | <b>Conc.:</b>  | <b>Efficiency:</b> | <b>Effective:</b>                   | <b>Observations:</b> |
| Oakite Products      | Inproclean 2000      | 10   | 99.65              | <input checked="" type="checkbox"/> |                      |
| Oakite Products      | Inproclean 61 B      | 5  | 99.99              | <input type="checkbox"/>            |                      |

Conclusion:

The Oakite Inproclean #2000 is probably the most promising of the cleaners tested to date. Need to further test for Plating Job Shop next week.