# CLEANING LABORATORY EVALUATION SUMMARY

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|---|---|
| SCL #: | 1995 |
| DateRun: | 06/21/1995 |
| Experimenters: | Donald Garlotta, Jay Jankauskas |
| ClientType: | Plating Job Shop |
| ProjectNumber: | Project #1 |
| Substrates: | Aluminum, Brass, Copper, Steel |
| PartType: | Coupon |
| Contaminants: | Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil |
| Cleaning Methods: | Mechanical Agitation |
| Analytical Methods: | Gravimetric |
| Purpose: | To evaluate cleaners for removal of oils |

Experimental Procedure:

Three cleaners will be tested: WR Grace Daraclean 294xx at 10%, Oakite Inproclean #3800 at 10% and a 10% Oakite #3800 solution with a 2% additive of Oakite Ladd. The Oakite Ladd supposedly will increase cleaning efficiency while reducing foam rates, so it will be interesting to see how well the Oakite Ladd additive performs.
The coupons were weighed before and after contamination. Cleaning was performed in an air sparged beaker at 150 F for 20 minutes. The coupons were then rinsed for 5 minutes at 150 F in a tap water rinse. The coupons were dried under an air knife for 2 minutes and then placed in a convection oven for 90 minutes. The coupons were then allowed to cool down overnight and then weighed in the morning. After the final weighing, the coupons were analyzed under a black light to check for fluorescing of any residual oils or wax.

SUBSTRATE MATERIAL:#1- 6061 Aluminum Coupons, #2- 110 Copper Coupons, #3- 260, Brass Coupons, #4- Steel boiler plate parts
CONTAMINANTS: Wax, ITW Safetap, Steco Corporation Tap magic Al cutting fluid, Park Chemical Corporation Haze Quench Oil
CONTAMINATING PROCESS USED: Coupons were dipped in wax and oils were brushed onto coupons

Results:

The Oakite 3800 performed exceptionally once again. The steel and Aluminum coupons were totally wax free and no noticeable oil residue. There was a slight wax buildup on the copper and brass coupons (the best bet would be to increase time). The foaming is definitely the big problem with the Inproclean #3800.

The Ladd additive did an excellent job of reducing the foam level. Cleaning was a little less effective than the Oakite #3800 alone but it still was excellent. There was no wax or oil on the Steel and Aluminum coupons. There was some slight residue on the copper coupon and quite a bit of wax remaining on the brass coupon. There was no etching on any of the coupons. Might want to increase cleaning time to remove residual wax.

The Daraclean 294xx was definitely the least effective. Wax residue was noticed on all coupons and excessive amounts of tap magic oil was noticed on the Brass coupon.

EXPERIMENTAL DATA LOG

GRAVIMENTRIC ANALYSIS

| sample # and substrate | clean mass (g) | mass with contamination (g) | mass after cleaning (g) | contaminant removed (g) | Percent Removal |
|---|---|---|---|---|---|
| *#32 Steel* | *127.5046* | *128.2982* | *127.5043* | *0.7939* | *100.04%* |
| *#5385 Brass* | *34.5390* | *35.0465* | *34.5394* | *0.5071* | *99.92%* |
| *#13 Aluminum* | *20.9996* | *21.9484* | *20.9997* | *0.9487* | *99.99%* |
| *#3527 Copper* | *35.3530* | *35.9061* | *35.3556* | *0.5505* | *99.53%* |
| **#17 Steel** | **128.3883** | **129.2071** | **128.3876** | **0.8195** | **100.09%** |
| **#3130 Brass** | **34.3117** | **34.8061** | **34.3148** | **0.4913** | **99.37%** |
| **#14 Aluminum** | **21.0161** | **21.7392** | **21.0170** | **0.7222** | **99.88%** |
| **#3276 Copper** | **35.3279** | **35.8522** | **35.3310** | **0.5212** | **99.41%** |
| #19 Steel | 123.1888 | 123.9450 | 123.1946 | 0.7504 | 99.23% |
| | 34.7619 | 35.2642 | 34.7650 | 0.4992 | 99.38% |

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| #7624 Brass | | | | | |
| #15 Aluminum | 20.9807 | 21.6497 | 20.9842 | 0.6655 | 99.48% |
| #3357 Copper | 35.3363 | 35.8803 | 35.3464 | 0.5339 | 98.14% |

*ITALICS*- Oakite Inproclean #3800

**BOLD-** Oakite Inproclean #3800 with Oakite Ladd additive

PLAIN- WR Grace Daraclean 294xx

Summary:

| **Substrates:** | Aluminum, Brass, Copper, Steel | | | | |
|---|---|---|---|---|---|
| **Contaminants:** | Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil | | | | |
| **Company Name:** | **Product Name:** | **Conc.:** | **Efficiency:** | **Effective:** | **Observations:** |
| Magnaflux | Daraclean 294 xx | 10 | 99.48 | ☐ | |
| Oakite Products | Inproclean 4000 T | 10 | 0.00 | ☐ | |
| Oakite Products | Inproclean 3800 | 10 | 99.37 | ☑ | |
| Oakite Products | Inproclean 3800 | 10 | 99.88 | ☑ | +2.5% Oakite Ladd additive |

Conclusion:

This trial was successful in the fact that the foam reduction on the Inproclean #3800 was reduced with the Ladd additive. The only problem is the slightly lower cleaning efficiency produced by the Ladd additive. We might want to think about increasing the concentration up to 15% or trying the Oakite Inproclean #2000 which we should receive next week.