

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1995
DateRun: 07/20/1995
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, Oil
Cleaning Methods: Mechanical Agitation
Analytical Methods: Gravimetric
Purpose: Evaluate four AW Chesterton products

Experimental Procedure: The purpose of this trial is to determine the effectiveness of the four new AW Chesterton products in removing the wax and oils for Plating Job Shop. This trial's setup is pretty much the same as Previous trials for Plating Job Shop. For each run, the coupons were checked at 5 minute intervals and removed when they appeared clean, or fifteen minutes elapsed (whichever came first). Cleaning was performed at 150 F. Rinsing was done in a tap water rinse (150 F) followed by a Di water rinse (100 F). The coupons were run under air knives for 2 minutes and then placed in a convection oven set at 120 F for one hour. The coupons cooled down for one hour and were then analyzed for cleanliness. A run of all four cleaners showed that the KPC 820N was the best cleaner. To further test out this cleaner, concentrations of 10 and 15 percent were used with the same cleaning conditions.

SUBSTRATE MATERIAL: Brass 260 coupons, Copper 110 coupons, Aluminum 6061 coupons, Steel boiler plate pieces
CONTAMINANTS: Wax, Safetap Grinding Lubricant, CI Hayes Quench Oil, Tap Magic Cutting Fluid.
CONTAMINATING PROCESS USED: Coupons dipped in wax and oils were applied with a swab.

Results: The 181 did ok. There was wax spotting on the brass and copper pieces and the steel piece had a thin waxy film on it. The aluminum looked very clean except for a couple of spots. Moderate foam
No foaming at all but the 217 did a horrible job in removing the wax.
The 803 did an exceptional job of removing the wax and oils. Moderate foaming. The one problem is that the Aluminum coupon etched pretty bad. A lower concentration may solve this.
AW Chesterton KPC 820N Excellent removal on all four substrates in just 5 minutes. A little bit of wax drag out was on the Aluminum coupon because it wasn't totally submerged.
Longer cleaning time is required because of the lower concentration. It seems that the Aluminum was attacked because the final weight was less than the original weight, and the coupon is a lot lighter in color.
Pretty much the same as the 10% except that there was a noticeable amount of wax on the copper coupon. Once again the Aluminum was attacked.

EXPERIMENTAL DATA LOG

GRAVIMETRIC ANALYSIS

| sample # and subs. and cleaner | clean mass (g) | mass with contamination (g) | mass after cleaning (g) | contaminant removed (g) | Percent Removal |
|--------------------------------|----------------|-----------------------------|-------------------------|-------------------------|-----------------|
| #24 Al -181 | 21.0158 | 21.9608 | 20.9978 | 0.963 | 101.90% |
| #6748 Br -181 | 34.6713 | 35.6164 | 34.6752 | 0.9412 | 99.59% |
| #4704 Cu - 181 | 35.4732 | 36.4391 | 35.4744 | 0.9647 | 99.88% |
| #48 Steel - 181 | 133.1562 | 134.7419 | 133.1666 | 1.5753 | 99.34% |
| #27 Al -217 | 20.9919 | 22.0748 | 20.9018 | 1.173 | 108.32% |
| #5221 Br -217 | 34.5169 | 35.6425 | 34.5833 | 1.0592 | 94.10% |

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|----------------------|----------|----------|----------|--------|---------|
| #2632 Cu -217 | 35.2652 | 36.1966 | 35.5087 | 0.6879 | 73.86% |
| #13 Steel -217 | 176.5640 | 178.7369 | 176.8863 | 1.8506 | 85.17% |
| #28 Al -803 | 20.9919 | 22.0875 | 20.9018 | 1.1857 | 108.22% |
| #5907 Br -803 | 34.5836 | 35.7179 | 34.5828 | 1.1351 | 100.07% |
| #3427 Cu -803 | 35.3454 | 36.2393 | 35.3452 | 0.8941 | 100.02% |
| #47 Steel -803 | 139.0012 | 140.5624 | 139.0044 | 1.558 | 99.80% |
| #19 Al -820 | 21.0103 | 21.9682 | 21.0112 | 0.957 | 99.91% |
| #5159 Br -820 | 34.5106 | 35.5798 | 34.5108 | 1.069 | 99.98% |
| #4149 Cu -820 | 35.4171 | 36.3466 | 35.4177 | 0.9289 | 99.94% |
| #45 Steel -820 | 133.2805 | 134.7706 | 133.2816 | 1.489 | 99.93% |
| #22 Al -820 | 20.9741 | 21.8801 | 20.9462 | 0.9339 | 103.08% |
| #2870 Br -820 | 34.2839 | 35.1457 | 34.2836 | 0.8621 | 100.03% |
| #3824 Cu -820 | 35.3843 | 36.2614 | 35.3854 | 0.876 | 99.87% |
| #58 Steel -820 | 127.7488 | 129.0977 | 127.7539 | 1.3438 | 99.62% |
| #25 Al -820 | 20.9985 | 22.0217 | 20.9726 | 1.0491 | 102.53% |
| #5004 Br -820 | 34.4961 | 35.4297 | 34.4959 | 0.9338 | 100.02% |
| #3153 Cu-820 | 35.3178 | 36.2194 | 35.3248 | 0.8946 | 99.22% |
| #58 Steel-820 | 127.7488 | 129.0977 | 127.7539 | 1.3438 | 99.62% |

Summary:

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|----------------------|---|---------------|--------------------|-------------------------------------|----------------------|
| Substrates: | Aluminum, Brass, Carbon Steel, Copper | | | | |
| Contaminants: | Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| AW Chesterton | 181 Low Alkaline Cleaner | 23 | 99.91 | <input type="checkbox"/> | |
| AW Chesterton | 217 Pressure wash | 23 | 108.32 | <input type="checkbox"/> | |
| AW Chesterton | KPC 820 N | 23 | 101.90 | <input checked="" type="checkbox"/> | |
| AW Chesterton | KPC 820 N | 20 | 99.93 | <input checked="" type="checkbox"/> | |
| AW Chesterton | KPC 820 N | 15 | 99.48 | <input checked="" type="checkbox"/> | |
| AW Chesterton | KPC 820 N | 10 | 99.94 | <input checked="" type="checkbox"/> | |

Conclusion:

Most successful trial to date for Plating Job Shop. The KPC 820N did an excellent job of removing the wax. It looks like all of the Chesterton cleaners tend to attack Aluminum with longer cleaning times. The best option would be the 20 percent solution for 5 minutes, or 10 percent solution for five minutes with brushing. Probably will do an aluminum attack test for the KPC 820N at different concentrations.