CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	1995
DateRun:	07/19/1995
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

GRAVIMENTRIC 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%
#2632 Cu -217	35.2652	36.1966	35.5087	0.6879	73.86%

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#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:

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	☐	
AW Chesterton	217 Pressure wash	23	108.32	☐	
AW Chesterton	KPC 820 N	23	101.90	☑	
AW Chesterton	KPC 820 N	20	99.93	☑	
AW Chesterton	KPC 820 N	15	99.48	☑	
AW Chesterton	KPC 820 N	10	99.94	☑	

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.