

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2019

DateRun: 07/29/2019

Experimenters: Nicole Kebler, Julie Nguyen

ClientType: Electroplating Company

ProjectNumber: Project #1

Substrates: Copper

PartType: Coupon

Contaminants: Lubricating/Lapping Oils, Oil

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric, Visual

Purpose: To evaluate six cleaning products for Rustlick 50/50 removal from copper coupons.

Experimental Procedure: Three pre-weighed copper coupons were used for each cleaner. The coupons were soiled halfway on one side using a hand-held swab before dirty weights were recorded. Dilutions and temperature for each cleaner was based on vendor recommendations. Coupons were immersed three at a time for 15 minutes, and visual observations were recorded every five minutes. Cleaned coupons were rinsed in heated (95^o F) tap water for five minutes, air dried for five minutes with a heat gun, and then final weights were recorded.

Results:

Cleaner	Initial wt. of cont.	Final wt. cont.	% Cont. Removed	Average
1	0.1138	0.0025	97.80	99.03
	0.0825	0.0002	99.76	
	0.0890	0.0004	99.55	
2	0.0550	0.0000	100.00	99.26
	0.0825	0.0006	99.27	
	0.0946	0.0014	98.52	
3	0.0506	0.0014	97.23	97.53
	0.0560	0.0010	98.21	
	0.0662	0.0019	97.13	
4	0.0867	0.0030	96.54	98.24
	0.1318	0.0011	99.16	
	0.0906	0.0009	99.01	
5	0.0924	0.0039	95.78	94.65
	0.0827	0.0050	93.95	
	0.0779	0.0045	94.22	
6	0.0773	0.0025	96.76	97.83
	0.0867	0.0007	99.19	
	0.0771	0.0019	97.54	

Visual Observations

Cleaner	5 Mins	10 Mins	15 Mins	Rinse
1	- immediate removal of all thin layer of soil - tiny clear bubbles forming - most soil removed before 5 min mark	- water turned slightly blue - some tiny clear bubbles on coupon	- water is slightly blue + cloudy - coupon looks clean - slight chemical smell	- coupon looks to be clean - dilution is clear

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2	<ul style="list-style-type: none"> - too cloudy to see 	<ul style="list-style-type: none"> - water clearing up - most soil looks to be removed - very small amount of tiny clear bubbles 	<ul style="list-style-type: none"> - coupon looks clean - water is clear 	<ul style="list-style-type: none"> - coupon looks to be clean - dilution is clear
3	<ul style="list-style-type: none"> - soil immediately turned pale blue - removing thin layers of soil before 5 mins - very thick layer of soils not removed 	<ul style="list-style-type: none"> - thicker layers of soil slowly being removed - clear tiny bubbles visible on coupon 	<ul style="list-style-type: none"> - water turning slightly cloudy + blue - lots of tiny clear bubbles 	<ul style="list-style-type: none"> - coupon looks to be clean - dilution is clear
4	<ul style="list-style-type: none"> - soil immediately coming off - blue swirls (due to agitation) visible - swirls moving to top of water 	<ul style="list-style-type: none"> - water slightly turning blue - tiny clear bubbles visible on coupon - thicker layer of soil still remain on coupon 	<ul style="list-style-type: none"> - very little soil still on coupon - flakes of soil floating at top - water turning cloudy + blue 	<ul style="list-style-type: none"> - coupon looks to be clean - dilution is clear
5	<ul style="list-style-type: none"> - soil immediately turned pale blue - soil forming swirls (due to agitation) 	<ul style="list-style-type: none"> - thick layer of soil still remain - water getting cloudy - some soil still on coupon 	<ul style="list-style-type: none"> - coupons look fairly clean before 15 min mark 	<ul style="list-style-type: none"> - coupon looks to be clean - dilution is clear
6	<ul style="list-style-type: none"> - immediate blue swirls (soil coming off) - water getting slightly cloudy 	<ul style="list-style-type: none"> - some soil rising to top - very thin blue rim at top of water 	<ul style="list-style-type: none"> - water slightly cloudy - coupon looks fairly clean - tiny clear bubbles on coupon 	<ul style="list-style-type: none"> - coupon looks to be clean - dilution is clear

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Summary:

Substrates:		Copper				
Contaminants:		Lubricating/Lapping Oils, Oil				
Company Name:		Product Name:	Conc.:	Efficiency:	Effective:	Observations:
Brulin Corporation		Aquavantage 1400	5%	99.03	<input checked="" type="checkbox"/>	
Hubbard Hall Inc		Emerald HD2	15%	99.26	<input checked="" type="checkbox"/>	
Alconox Inc		Alconox	1%	97.53	<input checked="" type="checkbox"/>	
International Products Corporation		Micro 90 Conc.	2%	98.24	<input checked="" type="checkbox"/>	
Alconox Inc		Liquinox	1%	94.65	<input checked="" type="checkbox"/>	
Buckeye International		Immersion Cleaner	20%	97.83	<input checked="" type="checkbox"/>	

Conclusion:

All six cleaners were effective at removing Rustlick 50/50 from copper coupons. Next step would be to pick the top four best performing cleaners to test on dirty parts provided by Barry Industries.