CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2017
DateRun:	05/29/2017
Experimenters:	George Liang, Vinh Tran
ClientType:	Cleaner Manufacturer
ProjectNumber:	Project #1
Substrates:	Copper
PartType:	Part
Contaminants:	Greases, Waxes
Cleaning Methods:	Manual Wipe
Analytical Methods:	Gravimetric
Purpose:	To evaluate supplied product (Quicksolv DMC) for grease soil removal from copper coupons.

Experimental Procedure:

The following experimental procedure followed TURI's cleaning standard for grease soil removal with the manual SLW machine.

Soiling Process:

A set of pre-weighed copper coupons were soiled with 0.5 grams of multi-purpose super white grease soil using a hand held swab. Another set of pre-weighed copper coupons were soiled with 0.5 grams of wax blend using a hand held swab. The wax blend is made from a blend of polybutene oil 50%, and BE Square 50%. After soiling the coupons with the respective soils, each coupon was re-weighed for the amount of contaminants added.

Cleaning Process:

Three copper coupons soiled with the same soil were placed into a Gardner Straight Line Washability unit. A Wypall X60 reinforced wipe was attached to the cleaning sled and soaked with 1 spray of cleaning solution. Each coupon was sprayed once with the same cleaning solution. Each cleaning solution was used at full concentration. The solution was allowed to penetrate/contact for 30 seconds followed by cleaning in the SLW unit for 20 cycles (~33 seconds).

Efficacy Rating Process:

After cleaning, the coupons were left to sit at room temperature for 1 hour before re-weighing the coupons for the amount of contaminants removed. The efficacy of a cleaner is measured by the amount of contaminated removed using gravimetric analysis. As a general rule of the lab, an effective cleaner is observed to have an efficacy rating of 85% or higher.

Chemistries Evaluated: Quicksolv DMC; Acetone

Results:

The sample cleaner (Quicksolv DMC) was observed to be just as effective as the comparative cleaner (acetone) when removing multi-purpose super white grease soil from copper coupons: with respective efficacy ratings of: 90.56% and 86.77%. Similarly, the sample cleaner (Quicksolv DMC) was observed to be just as effective as the comparative cleaner (acetone) when removing wax blend soil from copper coupons: with respective efficacy ratings of 19.33% as compared to 14.55%.

Table pertaining to the amount of contaminant added and removed using a gravimetric scale, to measure the efficacy of the respective cleaners.

Initial wt. of Cont. (g)	Final wt. of Cont. (g)	Cont. Removed (%)	Avg. Cont. Removed (%)	Avg. Efficacy (%)
0.4965	0.0288	94.2	90.56	54.95 Quicksolv DMC
0.5008	0.0276	94.49		
0.4955	0.0843	82.99		
0.501	0.3967	20.82	19.67	
0.4992	0.3958	20.71		
0.4733	0.3906	17.47		
0.5166	0.3756	27.29	19	
0.4973	0.3934	20.89		
0.5189	0.4732	8.81		
0.4982	0.0562	88.72	86.77	50.66 Acetone
0.4982	0.0643	87.09		
0.5036	0.0781	84.49		
0.5041	0.4684	7.08	14.87	

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0.4987	0.3552	28.77		
0.4932	0.4501	8.74		
0.5051	0.4879	3.41	14.24	
0.5056	0.3278	35.17		
0.4983	0.4776	4.15		

*Note that there are two trials for cleaning the wax blend soil because the first trial was observed to have a high standard deviation. Therefore, a second trial was conducted to verify the results of the first trial. There is no significant difference between the first and second trial runs.

Summary:

Substrates:	Copper				
Contaminants:	Greases, Waxes				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
J.T. Baker	Acetone	100	86.77	☑	Multi-purpose super white grease; only 14 % on wax blend
Inventec Performance Chemicals	Quicksolv DMC	100	90.56	☑	Multi-purpose super white grease 90.56; Wax Blend 19.33

Conclusion:

In conclusion, the sampled cleaner (Quicksolv DMC) was just as effective as the comparative cleaner (acetone) for removal of both soils (white grease and wax blend).