CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2019
DateRun:	10/03/2019
Experimenters:	Nicole Kebler, Rimsha Paneru
ClientType:	Electroplating Company
ProjectNumber:	Project #2
Substrates:	Graphite
PartType:	Part
Contaminants:	Fluxes, Solder
Cleaning Methods:	Immersion/Soak
Analytical Methods:	Visual
Purpose:	To evaluate cleaners effectiveness at removing flux on graphite fixtures.

Experimental Procedure:

Pre-contaminated graphite fixtures were provided by the company. Each of the four cells on one fixture was rated based on how contaminated they were initially and rated again after drying. The following visual rating keys were used.

Initial Visual Rating Key

#	Description
1	No contamination
2	Minimal contamination
3	Partially contaminated
4	Mostly contaminated
5	Completely contaminated

Final Visual Rating Key

#	Description
1	Completely removed
2	Mostly removed
3	Partially removed
4	Minimal removal
5	No removal

One fixture was immersed in an unheated cleaner for 15 minutes. Visual observations of the fixture and flux removal were taken every five minutes, and the fixtures were air dried with room temperature forced air for five minutes before final observations.

Results:

Visual Observations:

Cleaner	5 Mins	10 mins	15 mins	Dry
1	- no visible bubbles - clear dilution	- no change	- no change	-Flux still present, minimal removal
2	- no visible bubbles - clear dilution	- no change	- no change	-Little to no removal

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3	- no visible bubbles - clear dilution	- no change	- no change	-No removal
4	- Bubbles on rim	- no change	-no change	-Minimal removal
5	- Bubbles on rim	- no change	- no change	-Little to no removal
6	-No change, No bubbles	- no change	- no change	-Residue left in middle
7	- Bubbles on surface	-Bubbles appearing	-Bubbles disappear	-No removal

Average Ratings:

Cleaner	Average Before Cleaning	Average After Cleaning
1	4.5	4
2	5	4.5
3	4.5	4.5
4	5	4
5	5	4.5
6	5	4.5
7	5	5

Summary:

Substrates:	Graphite
Contaminants:	Fluxes, Solder

Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
Fisher Scientific	Isopropanol (CAS: 67-63-0)	99%	0.00	☐	
JR Hess & Co., Inc.	Sta-Sol ESS 160	100%	0.00	☐	
Alconox Inc	Liquinox	1%	0.00	☐	
Brulin Corporation	Aquavantage 1400	5%	0.00	☐	
International Products Corporation	Micro 90 Conc.	2%	0.00	☐	
Fisher Scientific	Isopropanol (CAS: 67-63-0)	70%	0.00	☐	
Fisher Scientific	Isopropanol (CAS: 67-63-0)	10%	0.00	☐	

Conclusion:

None of the cleaners were effective with unheated immersion. Next step will be to add heat to cleaners that can be heated safely without engineering controls.