CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	1998
DateRun:	02/08/1998
Experimenters:	Jason Marshall, Prashant Trivedi
ClientType:	Manufactures parts for Semi-Conductor Industry
ProjectNumber:	Project #1
Substrates:	Alloys, Aluminum, Steel
PartType:	Part
Contaminants:	Cutting/Tapping Fluids, Lubricating/Lapping Oils, Dirt, Fingerprints, Oil
Cleaning Methods:	Ultrasonics
Analytical Methods:	Black light, Visual, microscopic
Purpose:	Replacement cleaner for Isopropanol and Acetone

Experimental Procedure:

The metal blades were first observed under a black light to check for any fluorescent contaminants. Then the parts were analyzed under a microscope to determine how dirty the parts were initially. Visual inspection was also made to further aid in the analysis of the parts.

After the examination for a base line level, the parts were divided into nine evenly distributed groups. Eight groups were to be cleaned and reanalyzed, and the ninth was to serve as the control group. The groups were strung onto nine separate wires.
Seven cleaners were selected from the lab based on past results and from the lab's database of cleaners. Five percent solutions were made into 600 mL beakers with DI water. The eighth cleaner was tap water. The solutions were then heated to 130 F. The beakers were suspended in a 40 kHz ultrasonics tank, and the parts were cleaned for five minutes. Parts were rinsed in 120 F tap water for one minute. Agitation was provided to the rinsing tank by lifting and lowering the parts in the water. This was performed in order to insure all the parts were exposed to the rinse water. The same agitation was applied to the drying phase. Drying was done with an Original Disc Furnace portable heater, Model #1500IV until the parts were completely dry on visual inspection. (Forced air was not used in the lab because the air compressor is being fixed.)

SUBSTRATE MATERIAL: Blades made of: Aluminum (70%), Steel (20%), Carbides (10%)
CONTAMINANTS: Oil, fingerprints, dust, dirt

Results:

All of the cleaners selected as well as the tap water removed the contaminants that fluoresced under black light. Viewing the parts under the microscope, it was apparent that the cleaners selected proved to be effective. A ranking of the cleaners was made based on both experimenters' observations. Table 1 lists the cleaners in the order of effectiveness of removal on a microscopic and visual analysis.

Table 1 Ranking of Selected Cleaners

CLEANER	RANKING
MC-580	1
Sea Wash Neutral	4
A-2000XS	2
Inproclean 3800	3
MICRO	7
Shopmaster	5
Daraclean 282	6
Tap water	8
Control group	9

Attached on the following page are pictures taken with a Polaroid Microcam before and after cleaning of the blade edges. Film used was Polaroid 331 Professional autofilm. It is clearly shown that the excess contamination was removed with the ultrasonic cleaner.

Summary:

Substrates:	Alloys, Aluminum, Steel				
Contaminants:	Cutting/Tapping Fluids, Lubricating/Lapping Oils, Dirt, Fingerprints, Oil				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Matchless Metal Polish Company	MC 580	5	0.00	☑	
Warren Chemical Company	Sea Wash Neutral	5	0.00	☐	
US Polychem Corporation	Polychem A 2000 XS	5	0.00	☑	

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Oakite Products	Inproclean 3800	5	0.00	☐	
International Products Corporation	Micro (no longer available)	5	0.00	☐	
Buckeye International	Shopmaster	5	0.00	☐	
Magnaflux	Daraclean 282	5	0.00	☐	
Water	Water	100	0.00	☐	

Conclusion:

Any one of the cleaning chemistries selected would probably preform adequately for the removal of the contamination. The parts are being sent back to the client to see if the blades meet the requirements for use. During the cleaning portion of the experiment, an observation was made that could improve the efficiency. In the cleaning of the parts, the blades were resting against each other along the front/back interface. If a form of agitation is added to the ultrasonic tank, the parts in the middle of the group would be exposed to the ultrasonic bubbles, thus improving the cleaning of the blades. Either a side-to-side, a up-and-down, and/or a front-to-back motion would provide enough movement along the group to separate the fronts from the backs.