CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	1998
DateRun:	05/19/1998
Experimenters:	Jason Marshall
ClientType:	Electroplating Company
ProjectNumber:	Project #1
Substrates:	Brass
PartType:	Part
Contaminants:	Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil
Cleaning Methods:	Mechanical Agitation
Analytical Methods:	OSEE
Purpose:	Determine method for measuring cleanliness

Experimental Procedure:

The dirty brass parts were analyzed using OSEE prior to cleaning. Parts were configured so that the inside diameter were directly under the light source of the instrument. The highest number obtained was recorded. Parts were randomly selected from the lot provided to the lab. Surfaces subjected to ultraviolet (UV) light at the proper wavelength (energy), emit electrons under certain conditions. The process by which UV photons interact with the surface to excite electrons is known as OSEE. These emitted electrons are collected across an air gap by a biased collector and measured as a current which then is converted into a displayed voltage. Any contamination or thin film on the surface can either enhance or lessen the inherent emission. OSEE can
be used as a quick non-destructive, non-contact method to help establish a quantitative measure of surface cleanliness.

Samples were cleaned using MacDermid ND-17 in rotational energy. A 15% by volume cleaning solution was made and heated to 160 F. Cleaning lasted 5 minutes. Parts were rinsed with tap water at 120 oF for 30 seconds. Parts were dried using a Master Appliance Corp. Hot-air gun model HG-301A for 2 minutes. After cooling to room temperature, the parts were analyzed again with OSEE.

SUBSTRATE MATERIAL: Brass parts
CONTAMINANTS: Water Soluble Oil

Results:

Dirty and clean readings from the inside of the parts are listed in Table 1.
Table 1 OSEE Readings of Brass parts

Dirty	Clean	
1321	1282	
1351	1280	
1296	1283	
1293	1283	
1282	1284	
1352	1283	
1334	1287	
1339	1284	
1321	1283	Average

Summary:

Substrates:	Brass
Contaminants:	Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil

Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
MacDermid Industrial Products	ND 17	15	0.00	☑	

Conclusion:

The level of cleanliness obtained from the aqueous cleaner should now be compared to the TCE method. In order to ensure consistent results, new samples need to be obtained from the client. Three sets of parts are required: Dirty, cleaned with TCE (at client's facility) and the final cleaned with the aqueous cleaner (also at client's facility). Other areas of concern for the client to look into:

How full is the container holding the parts?
If the container is completely filled, the parts would not be free to move around to allow all the parts to be exposed to the cleaner. This would decrease the ability of the cleaner to get into the inside of the parts.
If the container is only filled 3/4 of the way, and a tumbling action is used, more parts would be exposed to the cleaner resulting in cleaner parts.
If the outside of the parts is being cleaned well enough to be plated, the aqueous cleaner should be able to remove the oil from the inside of the parts.