CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	1999
DateRun:	11/16/1999
Experimenters:	Jason Marshall
ClientType:	Bellows Mfr
ProjectNumber:	Project #1
Substrates:	Brass
PartType:	Part
Contaminants:	
Cleaning Methods:	
Analytical Methods:	Visual
Purpose:	To evaluate vacuum drying as a way to remove the moisture from inside the parts after rinsing.
Experimental Procedure:	Four parts were immersed in DI water for 30 seconds at room temperature. The parts were immediately placed in a VWR Vacuum oven at 170 F. The vacuum pump was operated using the following procedure: 1. Make sure all hoses are connected properly. One hose goes from the vacuum pump to the side neck of the vacuum trap. The other hose goes from the oven to the top neck of the vacuum trap. The left outlet on the top of the vacuum oven is for attachment of a drying tube so that no moist air from the lab enters into the oven when venting the oven at the conclusion of drying. 2. There are two (2) knobs on the top left front of the vacuum oven, just above the vacuum gauge. Turn the left knob clockwise and the right knob counterclockwise in order to obtain a vacuum. Turn on the heat button just below the vacuum gauge, and adjust the heat to the desired temperature via the heat control knobs. 3. Insert the sample(s) into the oven, close the door, and turn on the vacuum pump. The needle on the vacuum gauge should slowly rise until it reaches a value of between 25-30 in. Hg. The needle will eventually rise to 30 in. Hg. This is indicative that the sample is dry. The sample should be dried for at least 1/2 hour under heat, in the vacuum oven. If the needle doesn't eventually rise to 30 in. Hg. check the vacuum tubing and any related connections for a vacuum leak. A "bubbling" noise coming from the vacuum pump is also indicative of a vacuum leak. 4. When the sample is dry, turn off the vacuum pump and the heat for the oven. From step #5 of this procedure, turn the right knob clockwise and the left knob counterclockwise in order to release the vacuum from the oven. When the vacuum pressure has gone down to 0 in. Hg., open the oven door and remove the parts from the oven. After the parts were removed, each parts was tapped ten times on a white paper towel to determine if any moisture was remaining. Observations were recorded and compared to a part that was immersed in DI water and dried at room temperature. SUBSTRATE MATERIAL: Brass parts-bellows CONTAMINANTS: Water
Results:	All four parts showed no signs of water after drying using the vacuum oven. The one control parts had a lot of water trapped inside. (Each of the other drying methods, convection oven and displacement drying, performed previously had moisture inside them, as revealed through the tapping on the paper towel.)
Summary:	
Conclusion:	The use of a vacuum oven proved to effective in removing water that has been trapped inside the parts. One final test will be performed to incorporate the entire cleaning process. All four products will be used in ultrasonic cleaning at 130 F, rinsing with DI water at 130 F and drying in a vacuum oven at 170 F.