

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2000  
 DateRun: 07/27/2000  
 Experimenters: Jason Marshall  
 ClientType: Bellows Mfr  
 ProjectNumber: Project #1  
 Substrates: Aluminum  
 PartType: Part  
 Contaminants: Greases, Lubricating/Lapping Oils  
 Cleaning Methods: Ultrasonics  
 Analytical Methods: Visual  
 Purpose: To evaluate cleaning process using supplied parts.

Experimental Procedure: Two cleaners were selected from the previous trial based on the effective cleaning results obtained. Both solutions were diluted to 5% by volume using DI water in 600 ml beakers and heated to 130 F in the ultrasonic tank filled with tap water. Five contaminated types of parts were immersed in the beakers in the ultrasonic unit. After ten minutes of cleaning, the various parts were removed from the ultrasonic energy and rinsed for 30 seconds in tap water at 120 F. Drying was performed in a VWR Scientific Vacuum oven at 250 F for 10 minutes at a pressure of 30 in Hg. Parts were allowed to cool to room temperature and sealed in plastic bags to be sent back to the client for analysis.

SUBSTRATE MATERIAL: Aluminum parts (AM 350, AL 6061)  
 CONTAMINANTS: Grease (Cello-Seal), Oil (Elf Lubricant North America Elf Cut 51 [64742-53-6, 64742-52-5, 63449-39-8, 8016-28-2])  
 CONTAMINATING PROCESS USED: Parts received contaminated.

Results: All types of parts appeared to be visually clean. It was noted that both sets of the MOD's cleaned in Beyond 2001 were not completely dry. Also, one set of the MOD's cleaned in All Clear 450 did not dry all the way. All other parts were dried to completion. Table 2 lists the part types used and notes which ones were not completely dried.

Table 2. Part Description

|    | PCR# | Order# | Desc  | Part#   | Mat'l   | Notes                                   | Beyond 2001 | United 450 |
|----|------|--------|-------|---------|---------|---|-------------|------------|
| #6 | 2424 | Weld   | ID's  | Rejects | AM 350  | Not Cleaned                             |             |            |
| #8 | Misc | Weld   | MOD's | Rejects | AM 350  | Not Cleaned                             |             | Not Dry    |
| #3 | 2496 | ---    | M-C   | ---     | 6061 AL | Machine Chill using Elfdwaw 51          |             |            |
| #9 | Misc | Weld   | MOD's | Rejects | AM350   | Leak checked contaminated w/ Cello-Seal | Not Dry     | Not Dry    |
| #1 | 2498 | ---    | FD    | ---     | AM 350  |   | Not Cleaned |            |

Summary:

|                                   |  |                                   |  |               |                    |                                     |
|-----------------------------------|--|-----------------------------------|--|---------------|--------------------|-------------------------------------|
| <b>Substrates:</b>                |  | Aluminum                          |  |               |                    |                                     |
| <b>Contaminants:</b>              |  | Greases, Lubricating/Lapping Oils |  |               |                    |                                     |
| <b>Company Name:</b>              |  | <b>Product Name:</b>              |  | <b>Conc.:</b> | <b>Efficiency:</b> | <b>Effective:</b>                   |
| Today & Beyond                    |  | Beyond 2001                       |  | 5             |                    | <input checked="" type="checkbox"/> |
| United Laboratories International |  | United 450 All Clear              |  | 5             |                    | <input checked="" type="checkbox"/> |

Conclusion:

The two cleaners seem to be capable of removing the different types of contaminants from the various part configurations using ultrasonic energy. Drying of the MOD pieces require longer drying times due to the design of the parts (an additional 15 minutes may be enough to complete the drying of these parts).