CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1997

DateRun: 09/03/1997

Experimenters: Jason Marshall, Prashant Trivedi

ClientType: Tire Manufacturer

ProjectNumber: Project #1

Substrates: Steel

PartType: Part

Contaminants: Cutting/Tapping Fluids, Lubricating/Lapping Oils, Mold Releases, Dirt, Rubber, Oil

Cleaning Methods: Ultrasonics

Analytical Methods: Visual

Purpose: To identify more effective cleaning method.

Experimental Procedure: A cleaner was selected for use from the laboratory's database. A five percent solution was heated to 130 F in the 40 kHz tank. The mold was then placed into the tank. Only half of the mold was submerged in the cleaning solution. Observations were made at five minute intervals for a total of thirty minutes. After the cleaning, the part was rinsed with tap water at room temperature for thirty seconds. The part was allowed to air dry.
SUBSTRATE MATERIAL: Steel (Supplied from client)
CONTAMINANTS: Oil, silicone, dirt, rubber
CONTAMINATING PROCESS USED: Part received contaminated from client

Results:

TIME	OBSERVATION
5 minutes	Some of oil and dirt were removed
10 minutes	Most of oil and dirt were removed-rubber wasn't effected
15 minutes	Almost all of oil and dirt were removed-rubber not effected
20 minutes	Rubber not effected
25 minutes	Rubber not effected
30 minutes	Rubber not effected

The half of the mold that was cleaned did appeared to be a lot cleaner than the uncleaned half. After the part was rinsed and dried, some of the rubber was scrapped off from the cleaned and the uncleaned halves. The cleaned half required less force to remove the rubber.

Upon observing the cleaner left in the ultrasonic unit, the solution appeared to be very murky from the contaminants removed. There appeared to be some of the rubber floating on the surface of the cleaning bath.

Summary:

Substrates:	Steel				
Contaminants:	Cutting/Tapping Fluids, Lubricating/Lapping Oils, Mold Releases, Dirt, Rubber, Oil				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Magnaflux	Daraclean 235	5	0.00	☐	

Conclusion: Ultrasonic cleaning in the 40 kHz range, the most commonly used frequency in industrial cleaning for the removal of oil residues, was not effective in removing the rubber contaminant. Since lower frequencies generate a larger ultrasonic "bubble" and, therefore, more mechanical energy, a 20 kHz aqueous cleaning trial is recommended. A supporting Surface Cleaning Laboratory (SCL) Case Study is attached. Following that approach, media blasting, in particular with crystalline sodium bicarbonate (i.e. baking soda) may also prove to be a safer, environmentally friendlier cleaning alternative. Both testing procedures are available at/through SCL. We await the customer's decision to continue testing.