CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2001

DateRun: 01/18/2001

Experimenters: Jason Marshall, John Brunelle

ClientType: Chemical Company

ProjectNumber: Project #1

Substrates: Stainless Steel

PartType: Part

Contaminants: Latex binder

Cleaning Methods: Ultrasonics

Analytical Methods: Timing

Purpose: To evaluate the effectiveness on cleaning the supplied parts using ultrasonics with the two effective cleaners from the previous trial.

Experimental Procedure: Two products from previous testing were diluted to 10% using DI water and heated to 135 F in the ultrasonic cleaning tank. One supplied static mixer was cleaned in each solution for one hour. Observations were made at 5, 10 ,15, 45 and 60 minutes. At each interval, the mixer was rinsed with a tap water spray at 120 F for 30 seconds. After rinsing, the flow through the mixer was observed by pouring 800 ml of water and recording the time.

SUBSTRATE MATERIAL: stainless steel static mixers
CONTAMINANTS: Latex binder (water 53.648%, Vultex CA-1 catalyst 0.724% (7664-41-7), Igepal CO-630 0.545% (9016-45-9), Biosoft D35 X 2.595%, Dur-O-Set NS 25-1823 24.447% (50-00-0), Fulatex Polymer 12.663%, Black pigment BS 15870 5.478%(1333-86-4), Repearl F-8025 0.900% (57-55-6)
CONTAMINATING PROCESS USED: Coated using eye dropper

Results: The supplied part labeled cleaned before was cleaned using the Oakite product and the partially used mixer was cleaned with the Brulin product. Initial flow rates for both mixers were compared to the new piece also supplied to the lab. Table 2 lists the initial flow rates for each mixer.

Table 2. Initial Flow Rate for 800 mL

MIXER	NEW	CLEANED BEFORE	PARTIALLY USED
Time	12 seconds	35 seconds	30 seconds
FLOW RATE	66.7 ml/ sec	22.9 ml/sec	26.7 ml/sec

After the first two cleaning intervals the flow rate for both the dirty parts increased. Despite the initial increase, after 15 minutes of cleaning, it appeared that the flow rates leveled off and then began to drop. The flow rates at the different intervals are listed in Table 3.

Table 3. Flow Rates

Cleaning Interval (min)	Cleaned Before (ml/sec)	Partially Used (ml/sec)
5	32	30.8
10	34.8	34.8
15	24.2	34.8
45	32	29.6
60	21.6	25

Summary:

Substrates:	Stainless Steel				
Contaminants:	Latex binder				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Brulin Corporation	Formula 815 GD	10	0.00	☑	
Oakite Products	Inproclean 3800	10	0.00	☑	

Conclusion: The initial assumption that could be made about the results of the cleaning would be that the products were not cleaning the mixers. Despite the fact that the flow rates decreased over time, the trial led to the belief that the reason for the slower flow rates was due to cleaning taking place within the mixer. The only problem was that the dislodged contaminants were getting clogged in side the mixer due to the complex design of the mixer. The claim of successful cleaning could be justified by looking at the ends of both mixers. They were initially very dirty. At the end of the cleaning cycle, the ends appeared to be cleaner than when the testing started. The insertion and removal of a white nylon brush into the tubes further

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showed that cleaning was taking place. To better cleaning the static mixing tubes, the lab would suggest using a long narrow brush in conjunction with the cleaning solutions. An additional test will be performed using semi-aqueous solutions to determine if this type of cleaner would be effective on the contaminants.