CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1996

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ClientType: Coatings Manufacturer

ProjectNumber: Project #1

Substrates: Stainless Steel

PartType: Coupon

Contaminants: Adhesive, Coatings

Cleaning Methods: Low Pressure Spray

Analytical Methods: Gravimetric

Purpose: To determine the amount of foam generation

Experimental Procedure: The purpose of this experiment is (1) to determine the effect of temperature on the cleaning effectiveness of the 69 MC, (2) determine the amount of foam generation at various temperatures.
For this experiment 3 10"x 16" 304 Stainless steel pieces were contaminated with the Basecoat #51144. The contamination process was the same as previous experiments.
Cleaning was performed in the lab's Miele pressure washer. The Miele recirculates 4.5 gallons of solution with a discharge pressure of 13 psi. The Stainless-steel pieces were arranged in the pressure washer so that the face of the sheets was directly facing the spray jets.
Cleaning was performed at 90, 120 and 160 F with 15% solution of 69MC. A lower concentration was used due to operating problems with the Miele washer. The parts were cleaned for 30 minutes at the desired temperature. The pieces were then rinsed with room temperature tap water from a handheld spray system. Cleanliness was determined by gravimetric methods. Foam level in the Miele was also evaluated for each temperature.
SUBSTRATE MATERIAL: 304 Stainless Steel
CONTAMINANTS: Durane Basecoat #51144

Results: The percent removal for the different temperatures were as follows:

Temperature	clean mass (g)	mass with contamination (g)	mass after cleaning (g)	contaminant removed (g)	Percent Removal
90F	1121.2	1206.0	1200.6	5.4	6.37%
120F	1124.9	1190.7	1186.9	3.8	5.78%
160F	1452.2	1504.4	1483.9	20.5	39.27%

Although the Miele did not remove all of the basecoat #51144, there were several clean spots, and the urethane could be peeled off of the plate. The main reason for the lack of cleaning was the low concentration used. Originally, I was planning to use a 30% solution, but between cycles, the Miele dumped out half of the 30% solution. More cleaning solution had to be added to the Miele to activate the hating coils, but the lab ran out of concentrated 69MC solution, so water had to be added.

The 69 MC posed no foaming problems at all temperatures.

Summary:

Substrates:	Stainless Steel				
Contaminants:	Adhesive, Coatings				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
US Polychem Corporation	Product 69 MC	15	0.00	☑	

Conclusion: 1- Initial cleanliness testing using stainless steel coupons and contaminants-
Compare Envirosol with 4 different cleaners used in automotive degreasing.
Alkaline Aqueous - ChemWash Green Stuff
Neutral Aqueous - Safety Kleene aqueous cleaner
Semi-Aqueous- D-limonene blend (Envirosolutions Inc Bio T 300B)
Hydrocarbon- Solvent Kleene Degrease 500
Use two different contaminants
A used motor oil and dirt mixture baked on in a convection oven
Some sort of lube or bearing grease
Substrate
Stainless or Carbon Steel

5 minutes at room temp and full strength (or would we want to use general cleaning dilutions). Rinse (DI water static beaker bath for 30 sec).
Drying- air knife blowoff followed by mild heat in convection oven (140 F).

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Best analysis would be gravimetric. Twenty-five coupons can be conceivably cleaned in a day and then be precleaned, weighed and contaminated for the next day. If just a full-strength solution of Envirosol was used two days of testing would be required. For three different concentrations, about 3 days would be needed.

2- Soil loading tests-Use four different concentrations of Envirosol (25% 50% and full) dissolve in a specified weight of contaminant (probably would just use one contaminant to expedite testing) Follow testing protocol for Coatings Manufacturer Soil loading can be done in two days of testing if five coupons per run was done. Do loading concentrations of 10% by weight of Envirosol in solution (should get equal readings if the soil loading varies linearly with concentration

3- Testing of drag-out problem- Kicking around a few ideas-Increase volatility (would work but then if too evaporative might be considered a VOC would probably want to use an EPA method 8240 for maximum theoretical VOC's, Increased volatility would
increase worker exposure).

Tweek formulation so it is water rinseable-in my opinion, this would be the best idea. Need to think about sewer discharge limits (1000 ppm from what I remember). Possible reclamation out of rinsewater in a still system.