CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1997

DateRun: 08/12/1997

Experimenters: Jason Marshall, Prashant Trivedi

ClientType: Machining Company

ProjectNumber: Project #1

Substrates: Steel

PartType: Part

Contaminants: Lubricating/Lapping Oils, Metal fines

Cleaning Methods: Immersion/Soak

Analytical Methods: FTIR, Visual

Purpose: Sample part cleaning.

Experimental Procedure: Six cleaners were selected for use in cleaning. Five percent solutions were made in beakers. The solutions were then heated to 130 F on a hot plate. One sample part was cleaned using stir bar agitation in each cleaner for five minutes. After the cleaning, the parts were rinsed in tap water for thirty seconds at 120F. Finally, the parts were then dried for one minute per side under an infrared heat lamp.

Upon completion of the cleaning cycle, the part were analyzed for cleanliness using the FTIR instrument. The base line was determined using one part that was cleaned using the 40kHz ultrasonic unit for two minutes, then wiped with an alcohol treated towel and finally the part was wiped with a Hubbard-Hall 225 AES treated towel. Once the base line was determined, a non-cleaned part was analyzed to determine which peak range to use. Having selected a range, each cleaned part was then observed in that region. The area under the peak was determined and recorded. The part with the smallest area under the peak would be the cleanest. The cleaners used were:
Company Name-Product Name
Ardrox-6333
Brulin & Company-815 PCX
Calgon Corporation-AK 6215
Polychem-2000P
Innovative Organics-Amberclean
Hubbard Hall-Aquaclean
SUBSTRATE MATERIAL: 1010 cold rolled steel
CONTAMINANTS: metal chips & Coolube 2210 (Triglycerol & propylene glycol esters of C8 & C10 acid)
CONTAMINATING PROCESS USED: Samples received contaminated from client

Results:

CLEANING EFFICIENCY							
Peak Range	Used:	1496-1419					
Product	Dirty part	6333	815PCX	AK-6215	2000P	Amberclean	Aquaclean
shift	15 to left	20 to right	30 to right	0	25 to left	38 to lift	15 to left
Area	68.52	13.23	43.114	8.67	54.11	47.14	50.11
Approximate% clean		80.7	37.1	87.3	21	31.2	26.9

Only two of the cleaners were effective in removing the contaminate from the parts. The two cleaners were Calgon AK-6215 and Ardrox 6333. Upon visual inspection, the same two solutions were determined to be the cleanest. There was a visible layer of oil still remaining on the other four parts.

Summary:

Substrates:	Steel				
Contaminants:	Lubricating/Lapping Oils, Metal fines				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Ardrox Inc	6333	5	80.70	☑	
Brulin Corporation	Formula 815 MX	5	37.10	☐	
Calgon Corporation	AK 6215	5	87.30	☑	
US Polychem Corporation	Polychem A 2000 P	5	21.00	☐	
Innovative Organics Inc	Amberclean L 12	5	31.20	☐	
General Chemical Corporation	Aquaclean 4784	5	26.90	☐	

Conclusion: Of the four cleaners used in the trial only two were determined to have adequate removal of the contaminant. These two cleaners will be used in the next trial. The experiment will incorporate the same

conditions except there will be mechanical energy used as well. The mechanical energy will be supplied in two forms, one being the 40 kHz ultrasonic unit and the other will be the Miele low pressure parts washer. The cleaned parts will be sent to the clients for analysis.