CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2021

DateRun: 02/17/2021

Experimenters: Zoe Lawson, Justin Kiander

ClientType: Precision Instrument Manufacturer

ProjectNumber: Project #1

Substrates: Steel

PartType: Part

Contaminants: Oil

Cleaning Methods: Ultrasonics

Analytical Methods: Gravimetric, Visual

Purpose: The purpose of this experiment was to determine the effectiveness of cleaners on steel parts provided by the company.

Experimental Procedure: Cleaners were prepared to the following concentrations: Metalnox 6386 100%, Water Works Heavy Duty Degreaser 7:1, SC Aircraft & Metal 20%. All solutions and an ultrasonic bath were heated to 100°F. Three steel cut out parts were obtained and weighed for each of the cleaners being tested. Parts had been presoiled with packaging oil by the company. Once solutions reached the proper temperature, parts were submerged into their respective cleaners for 15 minutes under ultrasonic cleaning. After 15 minutes, parts cleaned with SC Aircraft were submerged into a deionized water bath at 100°F for 30 seconds. All parts were then dried with an air gun at ambient temperature to remove excess solution and prevent damage to the substrate. Parts were allowed to finish drying in air for 24 hours. Following the drying step, parts were weighed and a clean weight was recorded. Effectiveness of the cleaners was determined.

Results:

Cleaner	Initial wt of part	Final wt of part	Effective
Metalnox 6386	17.7424	17.7376	Yes
	17.1949	17.1950	No
	17.4549	17.4514	Yes
Water Works	16.9595	16.9630	No
	16.8067	16.7986	Yes
	18.0233	18.0185	Yes
SC Aircraft & Metal	17.4061	17.4055	Yes
	17.3505	17.3426	Yes
	17.1702	17.1640	Yes

Because parts arrived presoiled, initial weights were not able to be obtained. An attempt was made to keep cleaning parts after the first cycle to achieve a stable "initial" weight, but weights fluctuated too much between trials to produce accurate results. The weights presented in the chart above represent the first cycle of cleaning. Contact angle testing would be ideal to determine cleanliness, however, at the time of testing the contact angle machine is not operational.

Overall, cleaners were successful in removing the packaging oil from the steel parts. Spots of rusting were observed on the back of parts cleaned with Water Works after the first full cleaning and drying cycle. To avoid rusting a full air gun dry of the front and back of the part to remove all excess solution is necessary. Next steps would be to continue testing on the steel parts with aviation grease added.

Summary:

Substrates:	Steel				
Contaminants:	Oil				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Kyzen Corporation	Metalnox M6386	100%	0.00	☑	
Keteca USA	Water Works Heavy Duty Degreaser	7:1	0.00	☑	Potential to rust, a full air gun dry after cleaning is necessary to prevent rusting.
Gemtek Products	SC Aircraft & Metal Cleaner Super Concentrate	20%	0.00	☑	

Conclusion: Upon completion of testing it was determined that all cleaners were effective at removing the packaging oils from steel parts. Next steps would be to progress testing to include the aviation grease soil on steel substrates.