

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2021
 DateRun: 07/20/2021
 Experimenters: Zoe Lawson, Justin Kiander
 ClientType: Metal Finishing
 ProjectNumber: Project #3
 Substrates: Stainless Steel
 PartType: Coupon
 Contaminants: Oil
 Cleaning Methods: Immersion/Soak
 Analytical Methods: Gravimetric, Visual

Purpose: The purpose of this experiment was to determine the effectiveness of alternatives with heated immersion.

Experimental Procedure: Cleaners were prepared to the following concentrations: Citranox 2%, Mirachem 500 20%, Water Works Heavy Duty Degreaser 7:1, SC Aircraft & Metal 20%, Aquaease 732 5%, Aquavantage 3800 GD 5%. All cleaners were heated to 100°F. Three stainless steel coupons were obtained and weighed for each of the cleaners being tested. Coupons were then soiled with oil provided by the company and a dirty weight was recorded. Once cleaners reached the proper temperature, coupons were submerged into their respective cleaners for 15 minutes. After 15 minutes had passed, coupons cleaned with SC Aircraft & Metal were rinsed in a deionized water bath at room temperature. All coupons were then allowed to dry in air for 24 hours. Following the drying period, coupons were weighed again and a clean weight was recorded. Effectiveness of the cleaners was determined.

Results:

Cleaner	Initial wt of cont.	Final wt of cont.	%Cont Removed	% AVG
Citranox	0.1495	0.0111	92.58	89.27
	0.0694	0.0102	85.30	
	0.1480	0.0149	89.93	
Mirachem 500	0.0871	0.0090	89.67	89.47
	0.1534	0.0113	92.63	
	0.0662	0.0092	86.10	
Water Works	0.1376	0.0097	92.95	92.75
	0.0831	0.0063	92.42	
	0.1716	0.0122	92.89	
SC Aircraft & Metal	0.0618	0.0025	95.95	96.53
	0.1472	0.0028	98.10	
	0.0761	0.0034	95.53	
Aquaease 732	0.1292	0.0079	93.89	89.41
	0.0702	0.0101	85.61	
	0.1516	0.0171	88.72	
Aquavantage 3800 GD	0.0635	0.0110	82.68	86.86
	0.1458	0.0096	93.42	
	0.0831	0.0129	84.48	

SC Aircraft & Metal was the most effective cleaner removing an average of 96.53% of the oil from stainless steel substrates. All cleaners showed significant improvement from previous trials except for Aquavantage 3800 GD, which performed best with unheated immersion and no rinse step. Further testing of Aquavantage 3800 GD should revert back to unheated immersion. However, all cleaners still possess a slight oil residue following the cleaning process. Increasing the temperature of heated immersion or adding a heated rinse step could help to eliminate the lingering residue.

Summary:

Substrates:	Stainless Steel				
Contaminants:	Oil				
Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
Alconox Inc	Citranox	2%	89.27	<input checked="" type="checkbox"/>	
Mirachem Corporation	Mirachem 500	20%	89.47	<input checked="" type="checkbox"/>	
Keteca USA	Water Works Heavy Duty Degreaser	7:1	92.75	<input checked="" type="checkbox"/>	

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Gemtek Products	SC Aircraft & Metal Cleaner Super Concentrate	20%	96.53	<input checked="" type="checkbox"/>	
Hubbard Hall Inc	Aquaease PL 732	5%	89.41	<input checked="" type="checkbox"/>	
Brulin Corporation	Aquavantage 3800 GD	5%	86.86	<input checked="" type="checkbox"/>	

Conclusion:

Upon completion of testing, it was determined that SC Aircraft & Metal was the most effective cleaner removing an average of 96.53% of the oil from stainless steel substrates. However, all coupons still possessed a slight oil residue following the cleaning process. Next steps would be to progress cleaners to a higher temperature or to add a heated rinse step to the current process.