

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1999
DateRun: 07/20/1999
Experimenters: Jason Marshall
ClientType: Consultant
ProjectNumber: Project #1
Substrates: Liquid
PartType: Part
Contaminants: Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil
Cleaning Methods:
Analytical Methods: Surfactant Titration
Purpose: To compare surfactant levels

Experimental Procedure: To compare surfactant levels of a cleaning solution before & after passing through separation equipment (Aqueous Recovery Resources, Inc., Suparator, oil-water separator) and a virgin sample of the solution. Three titrations were per sample were tested for nonionic surfactant content using Bama Chem Nonionic Surfactant Kit. The general procedure is as follows:
1. ADD APPROXIMATELY 25 ML OF WATER TO MIXING VIAL
2. ADD 8 DROPS OF INDICATOR SOLUTION TO VIAL. COLOR SHOULD BE GREEN.
3. ADD 15 DROPS OF 20% SULFURIC ACID TO VIAL (20 DROPS IF STRONGLY ALKALINE DETERGENTS ARE TESTED) AND SWIRL. COLOR SHOULD NOW BE PURPLE. (CAUTION: HANDLE THIS SOLUTION WITH CARE. IT IS CORROSIVE AND MAY CAUSE BURNS.)
4. ADD 0.5ML OF NONIONIC DETERGENT SOLUTION TO VIAL AND SWIRL, COLOR SHOULD NOW TURN BACK TO GREEN OR YELLOW-GREEN.
5. ADD TITRATING SOLUTION DROPWISE WHILE COUNTING UNTIL THE COLOR CHANGES TO A WINE-RED OR PURPLE. (ABOUT HALFWAY TO THE ENDPOINT THE COLOR WILL BE TAN OR LIGHT BROWN). NOTE THE NUMBER OF DROPS NEEDED AND MULTIPLY BY 0.5 TO GET % BY VOLUME OF NONIONIC DETERGENT. EACH DROP IS EQUIVALENT TO 0.0028 GRAMS OF SURFACTANT.
CHOOSE SAMPLE SIZE THAT WILL REQUIRE 10-20 DROPS OF TITRANT FOR BETTER ACCURACY. FOR VERY CONCENTRATED SURFACTANT SOLUTIONS USE A 0.10ML SAMPLE SO AS TO CONSERVE REAGENTS. FOR A 0.10ML SAMPLE USE A FACTOR OF 2.5.
FOR WEAKER SOLUTIONS:
1.00ML SAMPLE USE A FACTOR OF 0.25
10.00ML SAMPLE USE A FACTOR OF 0.025
100.00ML SAMPLE USE A FACTOR OF 0.0025
SOME INTERFERENCES - ACID SOLUBLE ANIONIC DETERGENTS CATIONIC DETERGENTS SOME AMINES
STRONG OXIDIZERS SUCH AS HYPOCHLORITES, NITRITES, ETC. HIGHLY CONCENTRATED DYES

The chemistries used were:

SITE	CLEANER MFR	PRODUCT	Notes:
Racine	Howard Supply Co	LT-5-100 Soak Cleaner	10 oz/gal
Racine	Howard Supply Co	LT-5-100 Soak Cleaner	Influent to Suparator
Racine	Howard Supply Co	LT-5-100 Soak Cleaner	Effluent from Suparator

Results: The solution appeared to have a vastly increased level of surfactant after passing through the oil-water separator. Table 1 list the values obtained for each stage of the cleaner.
Table 1. Surfactant Levels

Site:	Racine	
Cleaner	Influent	Effluent
8.33	13.33	46.67
13.33	13.33	53.33
13.33	16.67	43.33
11.67	14.44	47.78

Table 2. Data from each stage of solution

CLEANING LABORATORY EVALUATION SUMMARY

Table 2.	Data from each stage of solution	
Client	EPA/Supervisor Chris Underwood	
Client Type	Consultant	
SCL #	99-7104-02-5	
Test Type	Nonionic	
Cleaner Mfr	Racine Cleaner	
Product Name	LT-5-100 Soak Cleaner	
Concentration Used	7.5 %	
Drops Required	6	
Sample Size	1.5 mL	
Wt of Surfactant	0.0168 grams	
drop * f	1 % by volume of nonionic surfactant	
Dilution correction	13.33	
Total Surfactant	13.33	
Mfr	Racine Cleaner	
Product		
Conc. %	7.5	
Volume	1.5	
Wt of Surf	0.0168 in Sample	
% Surf.	1 in Sample	
Total Surf %	13.33	
Experimenter	Marshall	
Date	7/20/99	
Client Type	Consultant	
SCL #	99-7104-02-5	
Test Type	Nonionic	
Cleaner Mfr	Racine Influent	
Product Name	LT-5-100 Soak Cleaner	
Concentration Used	7.5 %	
Drops Required	4	
Sample Size	1 mL	
Wt of Surfactant	0.0112 grams	
drop * f	1 % by volume of nonionic surfactant	
Dilution correction	13.33	
Total Surfactant	13.33	
Mfr	Racine Influent	
Product	LT-5-100 Soak Cleaner	
Conc. %	7.5	
Volume	1	
Wt of Surf	0.0112 in Sample	
% Surf.	1 in Sample	

CLEANING LABORATORY EVALUATION SUMMARY

Total Surf %	13.33	Full strength
Experimenter	Marshall	
Date	7/20/99	
Client Type	Consultant	
SCL #	99-7104-02-5	
Test Type	Nonionic	
Cleaner Mfr	Racine Influent	
Product Name	LT-5-100 Soak Cleaner	
Concentration Used	7.5 %	
Drops Required	4	
Sample Size	1 mL	
Wt of Surfactant	0.0112	grams
drop * f	1	% by volume of nonionic surfactant
Dilution correction	13.33	
Total Surfactant	13.33	
Mfr	Racine Influent	
Product	LT-5-100 Soak Cleaner	
Conc. %	7.5	
Volume	1	
Wt of Surf	0.0112	in Sample
% Surf.	1	in Sample
Total Surf %	13.33	Full strength
Experimenter	Marshall	
Date	7/20/99	
Client Type	Consultant	
SCL #	99-7104-02-5	
Test Type	Nonionic	
Cleaner Mfr	Racine Influent	
Product Name	LT-5-100 Soak Cleaner	
Concentration Used	7.5 %	
Drops Required	5	
Sample Size	1 mL	
Wt of Surfactant	0.014	grams
drop * f	1.25	% by volume of nonionic surfactant
Dilution correction	13.33	
Total Surfactant	16.67	
Mfr	Racine Influent	
Product	LT-5-100 Soak Cleaner	
Conc. %	7.5	
Volume	1 mL	
Wt of Surf	0.014	in Sample
% Surf.	1.25	in Sample

CLEANING LABORATORY EVALUATION SUMMARY

Total Surf %	16.67	Full strength
Experimenter	Marshall	
Date	7/20/99	
Client Type	Consultant	
SCL #	99-7104-02-5	
Test Type	Nonionic	
Cleaner Mfr	Racine Effluent	
Product Name	LT-5-100 Soak Cleaner	
Concentration Used	7.5 %	
Drops Required	16	
Sample Size	1 mL	
Wt of Surfactant	0.0448	grams
drop * f	4	% by volume of nonionic surfactant
Dilution correction	13.33	
Total Surfactant	53.33	
Mfr	Racine Effluent	
Product	LT-5-100 Soak Cleaner	
Conc. %	7.5	
Volume	1 ml	
Wt of Surf	0.0448	in Sample
% Surf.	4	in Sample
Total Surf %	53.33	Full strength
Experimenter	Marshall	
Date	7/20/99	
Client Type	Consultant	
SCL #	99-7104-02-5	
Test Type	Nonionic	
Cleaner Mfr	Racine Effluent	
Product Name	LT-5-100 Soak Cleaner	
Concentration Used	7.5 %	
Drops Required	14	
Sample Size	1 mL	
Wt of Surfactant	0.0392	grams
drop * f	3.5	% by volume of nonionic surfactant
Dilution correction	13.33	
Total Surfactant	46.67	
Mfr	Racine Effluent	
Product	LT-5-100 Soak Cleaner	
Conc. %	7.5	
Volume	1	
Wt of Surf	0.0392	in Sample
% Surf.	3.5	in Sample

CLEANING LABORATORY EVALUATION SUMMARY

Total Surf %	46.67	Full strength
Experimenter	Marshall	
Date	7/20/99	
Client Type	Consultant	
SCL #	99-7104-02-5	
Test Type	Nonionic	
Cleaner Mfr	Racine Effluent	
Product Name	LT-5-100 Soak Cleaner	
Concentration Used	7.5 %	
Drops Required	13	
Sample Size	1 mL	
Wt of Surfactant	0.0364	grams
drop * f	3.25	% by volume of nonionic surfactant
Dilution correction	13.33	
Total Surfactant	43.33	
Mfr	Racine Effluent	
Product	LT-5-100 Soak Cleaner	
Conc. %	7.5	
Volume	1	
Wt of Surf	0.0364	in Sample
% Surf.	3.25	in Sample
Total Surf %	43.33	Full

Summary:

Conclusion:

The concentration of surfactant in the cleaning solutions were not decreased by passing through the Superator Oil-Water separator.