

EFFECT OF DEGRADATION ON FOAMING

TEST SUBSTANCE

Identity: A mixture containing perfluorooctanesulfonate, which may also be referred to as PFOS, FC-95, or as a component of FC-203A or FC-203 NFP. (1-Octanesulfonic acid) (CAS # 2795-39-3).

Remarks: The 3M production lot number was not noted. The test sample is FC-203A. Current information indicates it is a mixture of 1.34% test substance, 25% diethylene glycol butyl ether, 67.85% water, 2.66% Sultone foamer, 3% sodium octyl sulfate, 0.1% sodium lauryl sulfate, and 0.05% tolyltriazole.

The following summary applies to a mixture with incompletely characterized concentrations of impurities. Data may not accurately reflect the effects of the fluorochemical component of the test sample on foaming.

METHOD

Method: Experiment in conjunction with Modified OECD Screening Test, OECD 301E

GLP: No

Year Completed: 1980

Analytical monitoring: Foam height vs. time

Statistical methods: Results were determined by calculation of the foam height after shaking.

Test organism source: A 50:50 mix of soil extract and secondary effluent was used in the biodegradation test. The secondary effluent was Pigs Eye mixed liquor, while the soil was from E.A. Reiner's garden.

Test condition:

Dilution water: Nutrient solution

Reference and test solution preparation: OECD test culture collected from the end of the 28-day Modified OECD screening test. Samples diluted with nutrient solution to same concentrations as used in beginning of 28-day Modified OECD screening test. Vials capped and shaken vigorously by hand for 30 seconds.

Test vessels: #4 glass vials (4-1/2 in.).

Number of concentrations: Sample from the 28-day biodegradation test, freshly prepared solutions of identical concentration, and blank.

Temperature: Not given.

Total suspended solids and pH on day of testing: Not given.

Element Basis: Measured foam height

RESULTS

Nominal concentrations: Blank, freshly-prepared solution, solution from 28 day test. Test material concentration of each at ~ 280 mg/L.

Element values: Foam height (30 sec.) = 15 mm (fresh solution)
 Foam height (30 sec.) = 5 mm (solution from biodeg. test)
 Foam height (30 sec.) = 10 mm (blank)

Remarks: Testing was conducted on the mixture as described in the Test Substance Remarks field. The values reported apply to that mixture and not the fluorochemical proportion alone.

CONCLUSIONS

Microbial metabolic activity reduces the ability of the test substance to foam.

Submitter: 3M Company, Environmental Laboratory, P.O. Box 33331, St. Paul, Minnesota, 55133

DATA QUALITY

Reliability: Klimisch ranking = 3. Study lacks description and records of the method followed. The sample purity was not properly characterized and the study lacks analytical confirmation of the amount of fluorochemical proportion in the solution.

REFERENCES

The studies were conducted by the 3M Company, Environmental Laboratory, St. Paul, MN, Lab Request number 5541S, 1980.

OTHER

Last changed: 6/28/00

Internal Correspondence

cc: D. L. Bacon/R. L. Bohon - 21-2W (58)
D. R. Ricker - 53-4N

To: J. A. PIGNATO - COMMERCIAL CHEMICALS DIVISION - 236-2A
From: E. A. REINER - ENVIRONMENTAL LABORATORY (EE&PC) - 21-BW (63)
Subject: EFFECT OF BIODEGRADATION ON FOAMING OF "LIGHT WATER" PRODUCTS
Date: AUGUST 6, 1980

3M

In conjunction with the OECD Modified Biodegradation Screening Test on FC-203, FC-206, and FC-3017, a side study was done that provided data on the effect of biodegradation on the foaming of "LIGHT WATER" products.

After 28 days of incubation, 25 ml of each OECD test culture was poured into separate #4 (4 1/2") glass vials. The vials were capped, shaken vigorously by hand for 30 seconds, and the foam height measured. Table 1 compares the results of these 28 day old cultures with those of freshly prepared "LIGHT WATER" solutions of identical concentration. Also compared in this table are 28 day old "LIGHT WATER" solutions kept sterile with 400 mg/l HgCl₂.

Table 1 - Foam Height After 30 Seconds of Vigorous Shaking

	280 mg/l FC-203 A	425 mg/l FC-206	210 mg/l FC-3017
Fresh Solution	15 mm	20 mm	12 mm
After 28 Days Biodegradation	5 mm	7 mm	2 mm
HgCl ₂ Stabilized For 28 Days	10 mm	15 mm	10 mm

These results clearly demonstrate that microbial metabolic activity reduces the ability of "LIGHT WATER" products to foam. These data may prove useful in responding to future customer inquiries about the treatability of these products.

Please call me on 778-5079 if you have any questions concerning this information.

E. A. Reiner

EAR/cel

ENVIRONMENTAL ENGR. LAB - WORK SHEET

SAMPLE DESCRIPTION

Date: 5-23-80

Analyst: W. G. Schild

Hrs.: _____

Foaming Experiment
(in conjunction with the Mod. OECD Screening Test)

At the end of the 28 day incubation period, 25 ml of each unfiltered culture medium was poured into separate vials (#4, 4 1/4", Kimbal®)

Replicate dilutions of the culture medium were also prepared fresh using the nutrient solution to dilute the test materials to the same concentrations as in the beginning of the OECD Mod. Screening Test, the only difference ^{in the fresh dilutions} being the absence of yeast extract and the inoculum in the fresh dilutions. 25 ml of the fresh dilutions were poured into vials as above.

The vials were capped and shaken vigorously by hand for 30 seconds and the foam height was measured - vs - time.

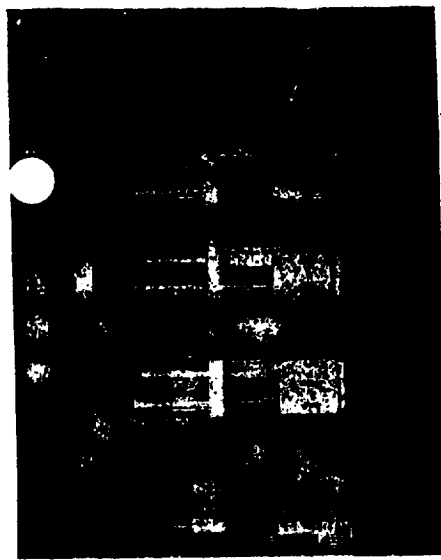
The foam height was measured looking perpendicular to the side of the vials. The foam near the edge of the vial was higher than in the middle.

See data sheet of foam height - vs - time and also various pictures taken after shaking samples. (Reviewed by: _____)

MILLIMETERS (MM) OF FOAM
HEIGHT - VS - TIME

ANALYSIS FORM 1038															
MILLIMETERS (MM) OF FOAM HEIGHT - VS - TIME															
FC-203 FC-2017 FC-20C															
1-0 (FRESH DILUTION) 1-1 1-2 1-3 2-0 (FRESH DILUTION) 2-1 2-2 2-3 3-0 (FRESH DILUTION) 3-1 3-2 3-3															
3M ENVIRONMENTAL LABORATORY FORMING EXPERIMENT IN CONNECTION WITH MOD. OECD SCREENING TEST															
LAB REQ # 5541 S DATE SHEET															
1	30 SEC.	14	5	6	10		12	1	3	10		20	7	7	15
2	1 MIN.	13	5	6	10		10	1	3	9		17	7	6	12
3	10 MIN.	12	4	5	8		6	1	2	7		13	5	4	8
4	30 MIN.	12	3	4	8		5	1	2	5		12	5	4	8
5	60 MIN.	10	3	3	7		5	1	2	4		8	5	4	6
6	75 MIN.	-	-	-	-		5	1	2	4		-	-	-	-
7	90 MIN.	-	-	-	-		-	-	-	-		8	5	4	6
8	100 MIN.	10	3	3	7		-	-	-	-		-	-	-	-
9	4 HR.	7	1	2	4		4	0	1	3		5	2	2	4
10	All of the time periods were monitored on the day of completion of the OECD Modified Screening test (5-09-80) with the exception of the 4HR readings. The samples were refrigerated in the vials on 5-09-80 and were reshaken on 5-13-80 after allowing them to equilibrate to room temperature. The 4HR readings were taken on 5-13-80. W.D. Schill 5-23-80														

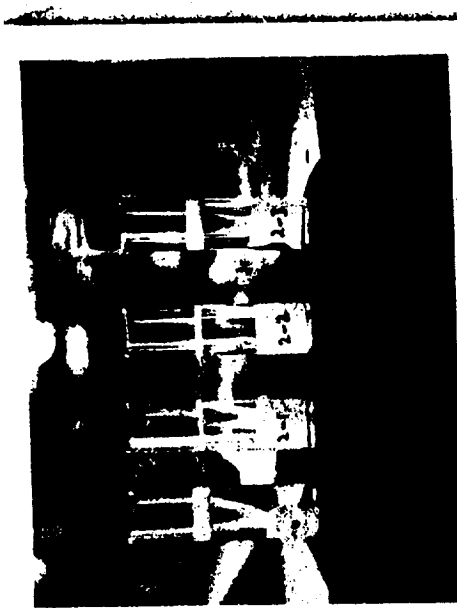
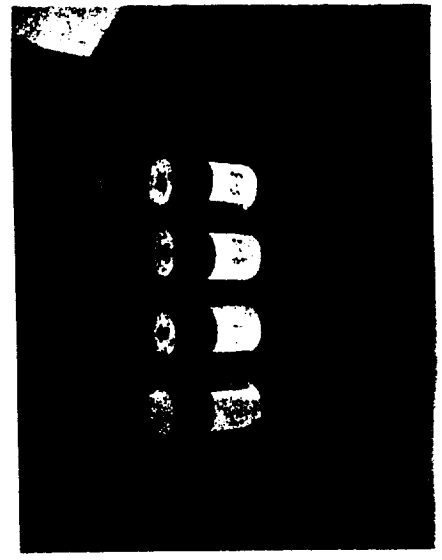
LR 5541 S



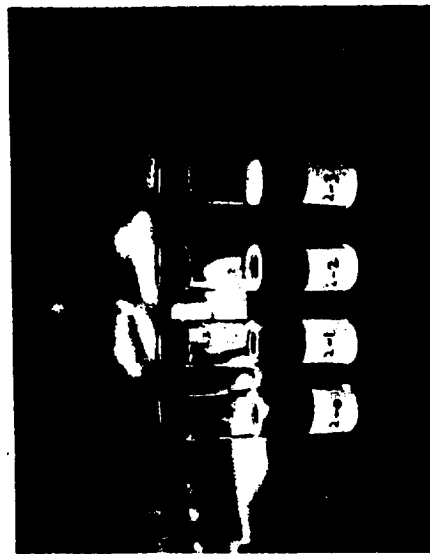
6 MIN



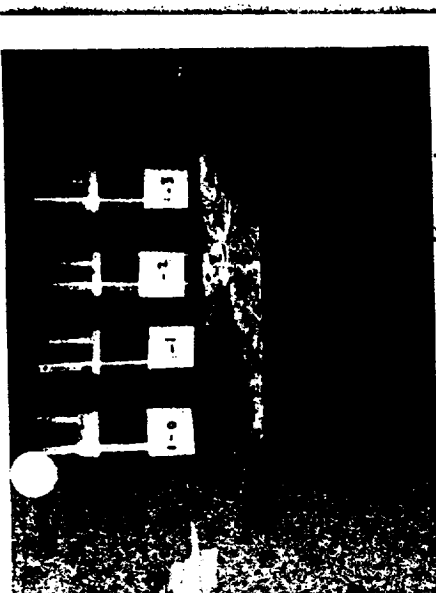
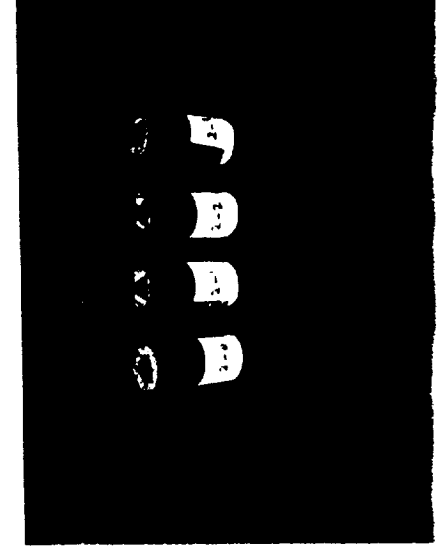
1 HR 20 MIN 120



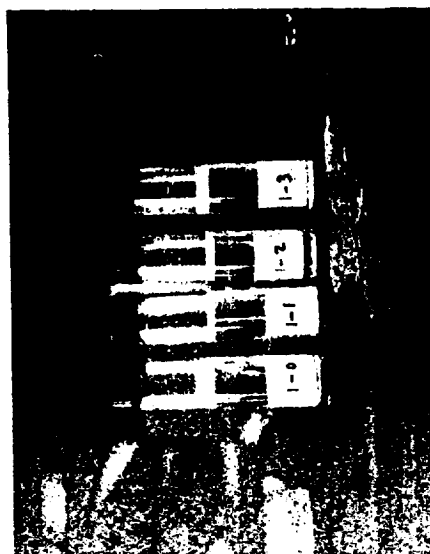
3 MIN 20 SEC.



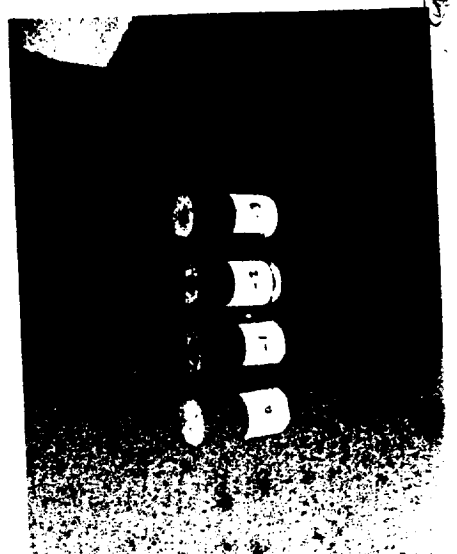
1 HR 25 MIN



7 1/2 MIN.



1 HR 35 MIN 135



ORIGINAL PHOTOS FILED IN ENV. LAB ARCHIVES.