

MICROBICS MICROTOX® TOXICITY TEST

TEST SUBSTANCE

Identity: A mixture containing perfluorooctanesulfonate, which may also be referred to as PFOS, FC-95, or as a component of FC-603F. (1-Octanesulfonic acid) (CAS # 2795-39-3).

Remarks: The 3M production lot number was 501. The test sample is FC-603F. Current information indicates it is a mixture of 0.5% PFOS, 7% diethylene glycol butyl ether, 82.95% water, 2% acrylic foamer, 4% Alkylether sulfate, 1.45% Xanthan gum, 1.4% calcium acetate, 0.07% N-(3-Chloroallyl)hexaminium chloride, 0.5% triethanolamine, 0.05% sodium hydroxide, 0.03% cis-1-(3-Chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride, and 0.05% tolyltriazole.

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

METHOD:

Method: Microbics Microtox® "BASIC" Procedure

Test type: Static acute

GLP: No

Year Completed: 1994

Species: *Photobacterium phosphoreum*

Analytical monitoring: pH and osmotic condition.

Exposure period: 30-minutes

Statistical methods: EC50 values calculated by statistical linear regression program provided for Microtox®

Test organism source: Microbics' Reagent, Lot AM025

Test conditions:

Diluent: Millipore Milli-Q™ water

Test temperature: Not noted.

Stock and test solution preparation: A 2000 mg/L primary stock solution was prepared by dissolving 200 mg test substance in 100 mL Millipore Milli-Q™ water. The pH of the stock solution was 6.7. An osmotic adjustment was made using 200 mg NaCl dissolved in 10 mL stock solution. Appearance of test solutions was noted as "clear and colorless". All test solutions were made by proportional dilutions.

Exposure vessels: 4 mL cuvettes.

Number of replicates: two

Number of concentrations: Four plus a blank control

Element basis: Percent light loss

RESULTS

Nominal concentrations: Blank control, 125, 250, 500, and 1000 mg/L

Element value: 5-minute EC₅₀ = 480 (450 – 510) mg/L
 15-minute EC₅₀ = 390 (370 – 420) mg/L
 30-minute EC₅₀ = 340 (320 – 350) mg/L

Element values based on nominal concentrations.

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

CONCLUSIONS

The FC-603F 30-minute EC₅₀ for *Photobacterium phosphoreum* was determined to be 340 mg/L with a 95% confidence interval of 320 to 350 mg/L.

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

DATA QUALITY

Reliability: Klimisch ranking = 2. This study meets the criteria for quality testing. However, sample purity was not properly characterized and the study lacks analytical confirmation of the amount of fluorochemical proportion in the solution.

REFERENCES

This study was conducted by the 3M Company, Environmental Laboratory, St. Paul, MN, Lab Request number M1655, 1994.

OTHER

Last changed: 6/26/00.

Microtox Test Data Summary

LR: M1655Date: 5/20/94Analyst: JD

SAMPLE: FC-603F (Lot #501)

Sample Conc. (mg/L)	% Reduction In Bioluminescence		
	5 min	15 min	30 min
125	18	24	25
250	35	39	43
500	50	55	59
1000	68	73	77
EC50 (95% C.I.)	480 mg/L (450-510)	390 mg/L (370-420)	340 mg/L (320-350)

Lab Request No. MI655

Environmental Lab — Work Sheet

Page 2 of 11

Sample Description

FC-603F

(Lot # 301)

Microtox testing of

FC-603F

Date: 5-20-94

Analyst: JBD

A) stock soln. preparation

→ Add 200 mg test substance to 100 mL volumetric.

Flush & dilute to volume with Milli-Q™

↳ Conc. = 2000 mg/L

B) Initial pH of stock soln. = 6.7 (no adjustment needed).

C) Cosmetic adjustment of stock soln.

→ Dissolve 200 mg solid NaCl in 10 mL stock soln.

(= 2% NaCl)

D) Appearance of stock soln = clear & colorless

30 min.

mic55

(3511)

MICROTOX DATA REPORT

SITE NAME: MISSISSAUGA

TEST DATE: 5-20-94

TEST TIME: -

Investigator: JBD

Approved by: -

Sample Description: EC-6035 Lot #5017

Procedure: BASIC

Demerol Adjustment: NAD

Initial Concentration: 1000 mg/L

Dilution Factor: 2

Test Time: 30 minutes

Concentration Units: mg/L

NUMBER	10/1	CONC.	GAMMA
1	79.89/76.25	125.0000	0.3146
2	83.37/78.44	125.0000	0.3418
3	79.05/57.44	250.0000	0.7265
4	75.95/54.82	250.0000	0.7312
5	77.78/40.41	500.0000	1.4517
6	71.93/35.72	500.0000	1.4710
7	78.55/21.56	1000.0000	3.3724
8	74.95/21.11	1000.0000	3.4333
CONTROL 10	112.73/54.13	125.0000	0.3146
RATIOS	1.24	1.2674	
COEFFICIENT	705	1.25	

Micetox

Reagent:

Lot # AM025

30 min.

m1655
(4811)

STATISTICAL THEORY IN TWO PARTS

DEFINITION: EQUATION: $y = a + bx$ $a = 1.2$ $b = 0.07$

LIST OF DATA PAIRS

1. 1.2 0.07

2. 1.2 0.07

3. 1.2 0.07

4. 1.2 0.07

5. 1.2 0.07

6. 1.2 0.07

7. 1.2 0.07

8. 1.2 0.07

9. 1.2 0.07

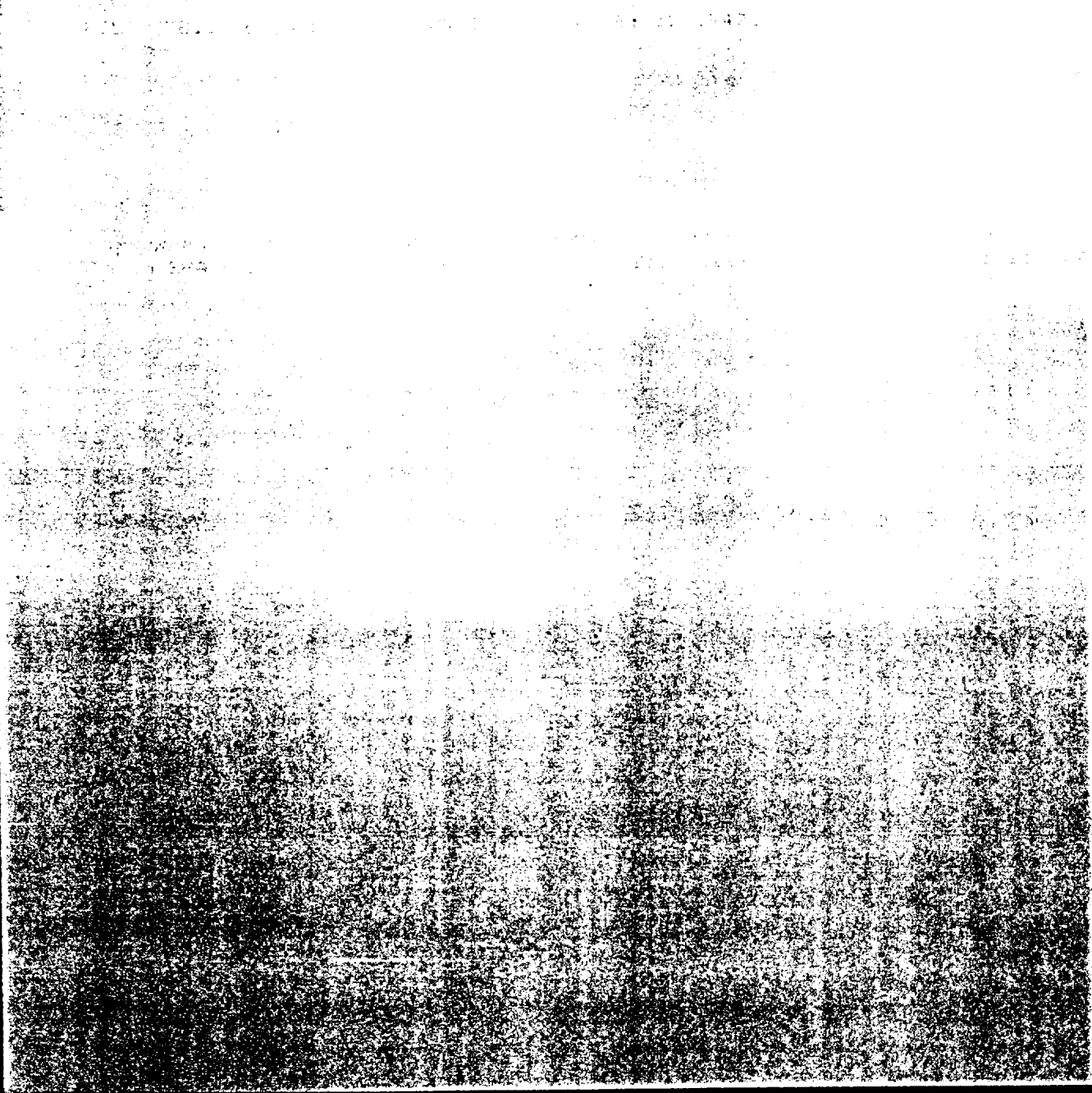
10. 1.2 0.07

30 min.

LR: m1655
(5 & 11)

STANDARD RESULTS

NUMBER	COND.	DATA	UNIT	% OF
1	125.0000	1.114	0.114	23.417
2	125.0000	1.114	0.114	23.417
3	250.0000	1.114	0.114	42.833
4	500.0000	1.114	0.114	85.667
5	1000.0000	1.114	0.114	171.333
6	2000.0000	1.114	0.114	342.667
7	4000.0000	1.114	0.114	685.333
8	8000.0000	1.114	0.114	1370.667



15 min.

m1655
(6811)

NUMBER	CONCENTRATION	6-5MA	PERCENT
1	125.0000	0.172	1.98
2	125.0000	0.248	28.84
3	250.0000	0.647	75.13
4	250.0000	1.436	16.71
5	250.0000	1.734	20.12
6	1000.0000	2.131	25.13
7	1000.0000	2.800	33.69

15 min.

m1655
(7 & 11)

CHLOROX DATA REPORT

FILE NAME: M1655.R15

TEST DATE: 5-20-94

TEST TIME: 10:00

Investigator: JRD

Sample Description: FGD effluent #5017

Procedure: Solid

Initial Concentration: 1.00 mg/L

Test Time: 15 minutes

TIME (min)	CHLOROX (mg/L)	CHLOROX (mg/L)	CHLOROX (mg/L)
0	1.00	1.00	1.00
15	0.89	0.89	0.89
30	0.87	0.87	0.87
45	0.85	0.85	0.85
60	0.83	0.83	0.83
75	0.81	0.81	0.81
90	0.79	0.79	0.79
105	0.77	0.77	0.77
120	0.75	0.75	0.75
135	0.73	0.73	0.73
150	0.71	0.71	0.71
165	0.69	0.69	0.69
180	0.67	0.67	0.67
195	0.65	0.65	0.65
210	0.63	0.63	0.63
225	0.61	0.61	0.61
240	0.59	0.59	0.59
255	0.57	0.57	0.57
270	0.55	0.55	0.55
285	0.53	0.53	0.53
300	0.51	0.51	0.51
315	0.49	0.49	0.49
330	0.47	0.47	0.47
345	0.45	0.45	0.45
360	0.43	0.43	0.43
375	0.41	0.41	0.41
390	0.39	0.39	0.39
405	0.37	0.37	0.37
420	0.35	0.35	0.35
435	0.33	0.33	0.33
450	0.31	0.31	0.31
465	0.29	0.29	0.29
480	0.27	0.27	0.27
495	0.25	0.25	0.25
510	0.23	0.23	0.23
525	0.21	0.21	0.21
540	0.19	0.19	0.19
555	0.17	0.17	0.17
570	0.15	0.15	0.15
585	0.13	0.13	0.13
600	0.11	0.11	0.11
615	0.09	0.09	0.09
630	0.07	0.07	0.07
645	0.05	0.05	0.05
660	0.03	0.03	0.03
675	0.01	0.01	0.01
690	0.00	0.00	0.00
705	0.00	0.00	0.00
720	0.00	0.00	0.00
735	0.00	0.00	0.00
750	0.00	0.00	0.00
765	0.00	0.00	0.00
780	0.00	0.00	0.00
795	0.00	0.00	0.00
810	0.00	0.00	0.00
825	0.00	0.00	0.00
840	0.00	0.00	0.00
855	0.00	0.00	0.00
870	0.00	0.00	0.00
885	0.00	0.00	0.00
900	0.00	0.00	0.00
915	0.00	0.00	0.00
930	0.00	0.00	0.00
945	0.00	0.00	0.00
960	0.00	0.00	0.00
975	0.00	0.00	0.00
990	0.00	0.00	0.00
1005	0.00	0.00	0.00
1020	0.00	0.00	0.00
1035	0.00	0.00	0.00
1050	0.00	0.00	0.00
1065	0.00	0.00	0.00
1080	0.00	0.00	0.00
1095	0.00	0.00	0.00
1110	0.00	0.00	0.00
1125	0.00	0.00	0.00
1140	0.00	0.00	0.00
1155	0.00	0.00	0.00
1170	0.00	0.00	0.00
1185	0.00	0.00	0.00
1200	0.00	0.00	0.00
1215	0.00	0.00	0.00
1230	0.00	0.00	0.00
1245	0.00	0.00	0.00
1260	0.00	0.00	0.00
1275	0.00	0.00	0.00
1290	0.00	0.00	0.00
1305	0.00	0.00	0.00
1320	0.00	0.00	0.00
1335	0.00	0.00	0.00
1350	0.00	0.00	0.00
1365	0.00	0.00	0.00
1380	0.00	0.00	0.00
1395	0.00	0.00	0.00
1410	0.00	0.00	0.00
1425	0.00	0.00	0.00
1440	0.00	0.00	0.00
1455	0.00	0.00	0.00
1470	0.00	0.00	0.00
1485	0.00	0.00	0.00
1500	0.00	0.00	0.00
1515	0.00	0.00	0.00
1530	0.00	0.00	0.00
1545	0.00	0.00	0.00
1560	0.00	0.00	0.00
1575	0.00	0.00	0.00
1590	0.00	0.00	0.00
1605	0.00	0.00	0.00
1620	0.00	0.00	0.00
1635	0.00	0.00	0.00
1650	0.00	0.00	0.00
1665	0.00	0.00	0.00
1680	0.00	0.00	0.00
1695	0.00	0.00	0.00
1710	0.00	0.00	0.00
1725	0.00	0.00	0.00
1740	0.00	0.00	0.00
1755	0.00	0.00	0.00
1770	0.00	0.00	0.00
1785	0.00	0.00	0.00
1800	0.00	0.00	0.00
1815	0.00	0.00	0.00
1830	0.00	0.00	0.00
1845	0.00	0.00	0.00
1860	0.00	0.00	0.00
1875	0.00	0.00	0.00
1890	0.00	0.00	0.00
1905	0.00	0.00	0.00
1920	0.00	0.00	0.00
1935	0.00	0.00	0.00
1950	0.00	0.00	0.00
1965	0.00	0.00	0.00
1980	0.00	0.00	0.00
1995	0.00	0.00	0.00
2010	0.00	0.00	0.00
2025	0.00	0.00	0.00
2040	0.00	0.00	0.00
2055	0.00	0.00	0.00
2070	0.00	0.00	0.00
2085	0.00	0.00	0.00
2100	0.00	0.00	0.00
2115	0.00	0.00	0.00
2130	0.00	0.00	0.00
2145	0.00	0.00	0.00
2160	0.00	0.00	0.00
2175	0.00	0.00	0.00
2190	0.00	0.00	0.00
2205	0.00	0.00	0.00
2220	0.00	0.00	0.00
2235	0.00	0.00	0.00
2250	0.00	0.00	0.00
2265	0.00	0.00	0.00
2280	0.00	0.00	0.00
2295	0.00	0.00	0.00
2310	0.00	0.00	0.00
2325	0.00	0.00	0.00
2340	0.00	0.00	0.00
2355	0.00	0.00	0.00
2370	0.00	0.00	0.00
2385	0.00	0.00	0.00
2400	0.00	0.00	0.00
2415	0.00	0.00	0.00
2430	0.00	0.00	0.00
2445	0.00	0.00	0.00
2460	0.00	0.00	0.00
2475	0.00	0.00	0.00
2490	0.00	0.00	0.00
2505	0.00	0.00	0.00
2520	0.00	0.00	0.00
2535	0.00	0.00	0.00
2550	0.00	0.00	0.00
2565	0.00	0.00	0.00
2580	0.00	0.00	0.00
2595	0.00	0.00	0.00
2610	0.00	0.00	0.00
2625	0.00	0.00	0.00
2640	0.00	0.00	0.00
2655	0.00	0.00	0.00
2670	0.00	0.00	0.00
2685	0.00	0.00	0.00
2700	0.00	0.00	0.00
2715	0.00	0.00	0.00
2730	0.00	0.00	0.00
2745	0.00	0.00	0.00
2760	0.00	0.00	0.00
2775	0.00	0.00	0.00
2790	0.00	0.00	0.00
2805	0.00	0.00	0.00
2820	0.00	0.00	0.00
2835	0.00	0.00	0.00
2850	0.00	0.00	0.00
2865	0.00	0.00	0.00
2880	0.00	0.00	0.00
2895	0.00	0.00	0.00
2910	0.00	0.00	0.00
2925	0.00	0.00	0.00
2940	0.00	0.00	0.00
2955	0.00	0.00	0.00
2970	0.00	0.00	0.00
2985	0.00	0.00	0.00
3000	0.00	0.00	0.00

CHLOROX DATA REPORT

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15 min.

m1655
(8 811)

STATISTICAL REPORT FOR DATA FILE #15

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5 min.

M1655
(9 of 11)

INITIAL DATA		M1655	
NUMBER	CONCENTRATION	AREA	W 54-57
1	125.000	0.184	15.04
2	125.00	0.072	10.11
3	125.000	0.071	14.31
4	125.000	0.071	15.73
5	500.000	0.047	11.17
6	500.00	0.047	10.11
7	100.000	0.047	10.11
8	100.000	0.047	10.11

5 min.

111055
(10811)

MICROTOX DATA REPORT

NAME: B1651K5

DATE: 5-20-94

Investigator: JTB

TEST TIME: 11:00

ANALYST: JTB

Sample Description: 50 mg of 100% pure

Procedure: BASIC

Calculated Adjustments: 14.01

Initial Concentration: 1000

Extraction Factor: 2.2

Initial Volume: 5.00 mL

Extraction Volume: 10.00 mL

Sample

Conc

1 70.57 18.14

2 70.57 18.14

3 70.57 18.14

4 70.57 18.14

5 70.57 18.14

6 70.57 18.14

7 70.57 18.14

8 70.57 18.14

9 70.57 18.14

10 70.57 18.14

11 70.57 18.14

12 70.57 18.14

13 70.57 18.14

14 70.57 18.14

15 70.57 18.14

16 70.57 18.14

17 70.57 18.14

18 70.57 18.14

19 70.57 18.14

20 70.57 18.14

EXTRACTION FACTOR

1000

1000

ELSO

100% CONCENTRATION 100%

CONFIDENTIAL NAME: 115 1115

5 min.

M1655
(11 & 11)

STATISTICAL REPORT FOR DATA FILE M1655

ESTIMATING EQUATION: $\log Y = 0.9936 + \log X + 0.0000$

NUMBER OF OBSERVATIONS USED: 10

STANDARD ERROR OF ESTIMATE: 0.0000

ADJUSTED R-SQUARED: 1.0000 FOR EC50

CORRELATION COEFFICIENT: $R = 0.9967$

COEFFICIENT OF DETERMINATION: $R^2 = 0.9934$

CONFIDENCE INTERVALS FOR CONFIDENCE BANDS:

LOWER 95% CONFIDENCE BAND: 0.0000 TO 0.0000

UPPER 95% CONFIDENCE BAND: 0.0000 TO 0.0000

LOWER 90% CONFIDENCE BAND: 0.0000 TO 0.0000

UPPER 90% CONFIDENCE BAND: 0.0000 TO 0.0000

ADDITIONAL RESULTS: