

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-787 or FC-787X. (1-Octanesulfonic acid) (CAS # 2795-39-3).

Remarks: The 3M production lot number was 101. The test sample is FC-787. Current information indicates it is a mixture of 0.73% PFOS, 10% diethylene glycol monobutyl ether, 79.74% water, 5% ethylene glycol, 1.47% propane Sultone foamer, 0.73% sodium octyl sulfate, 0.73% sodium decyl sulfate, 0.75% xanthan gum, 0.75% magnesium sulfate, 0.10% N-(3-chloroallyl)hexaminium chloride, and 0.05% benzotriazole.

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: Acute static

GLP: No

Year Completed: 1990.

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.

Test conditions:

Diluent: Microbics 2% NaCl solution

Test temperature: Not noted.

Stock and test solution preparation: A primary 2000 mg/L stock solution was prepared by dissolving 200 mg of test material in 100 mL of Millipore Milli-Q™ water. The pH of the stock solution was then adjusted from 5.5 to 6.8 using dilute NaOH. An osmotic adjustment was made using 200 mg NaCl dissolved in 10 mL stock solution. 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 = 330 (300 – 360) mg/L
15-minute EC₅₀ = 250 (240 – 270) mg/L
30-minute EC₅₀ = 210 (200 – 230) mg/L

Element values based on nominal concentrations.

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

The test substance 30-minute EC₅₀ for *Photobacterium phosphoreum* was determined to be 210 mg/L with a 95% confidence interval of 200 to 230 mg/L.

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

DATA QUALITY

Reliability: Klimisch ranking 2. The study meets the criteria for quality testing. However, the 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 Environmental Laboratory, St. Paul, MN, Lab Request number H1608, 1990.

OTHER

Last changed: 6/28/00.

LR H 1608

Environmental Laboratory

Mikrotox[®] Toxicity Testing Results

Test Substance: FC-787 Lot 101

Percent Light Loss			
Test Conc. mg/L	5-min. Exp.	15-min. Exp.	30-min. Exp.
125	28	32	34
250	42	49	54
500	63	70	76
1000	76	82	86
EC ₅₀ (95% C.I.) mg/L	330 (300-360)	250 (240-270)	210 (200-230)

ENVIRONMENTAL LABORATORY
MICROBICS MICROTOX^R SYSTEM

RAW DATA

LR H1608

pg 1 of 4

TEST SUBSTANCE: FC-787 Lot 101

TEST DATE: 8-16-90

ANALYST: Arcan A. Brach

SAMPLE CUVETTE	FINAL ASSAY CONCENTRATION mg/L	INITIAL READING I(0)	FINAL READINGS		
			5-MIN. I(5)	15-MIN. I(15)	30-MIN. I(30)
B1	BLANK CONTROL	94	60	58	50
C1	DUPLICATE	91	59	53	50
B2	125	99	45	39	35
C2	Duplicate	93	45	36	33
B3	250	92	34	26	22
C3	Duplicate	93	36	28	24
B4	500	101	24	17	13
C4	Duplicate	97	24	17	13
B5	1000	98	16	10	8
C5	Duplicate	98	15	10	7

Test Substance: Stock soln. - 200mg/100ml Milli-Q. Apparently completely miscible yellow liquid Initial stock soln. pH=5.5. Adj. to pH 6.8 with dilute NaOH

Osmotic Adjustment: Added 200mg NaCl to 10 ml sample
Final solution clear, no color apparent

Diluent's Microbics' 2% NaCl Solution

Initial Dilutions: Initial concentrations were double the final assay concentrations mentioned above. The initial dilutions were introduced into the top row & were transferred (50/50) into the next two rows.

pg 2 of 4

MICROTOX (R) DATA SHEET

FC-787 5-MIN EXPOSURE 8/16/90 SAB

PAIR #	CONC.	Io/It	G-OBS	G-EST	% Light Loss (1)
1	125.000	99.0/ 45.0	0.419	0.367	30 } 28
2	125.000	93.0/ 45.0	0.333	0.367	25 } 28
3	250.000	92.0/ 34.0	0.746	0.752	43 } 42
4	250.000	93.0/ 36.0	0.667	0.752	40 } 42
5	500.000	101.0/ 24.0	1.715	1.543	63 } 63
6	500.000	97.0/ 24.0	1.608	1.543	62 } 63
7	%1000.000	98.0/ 16.0	2.952	3.165	75 } 76
8	%1000.000	98.0/ 15.0	3.215	3.165	76 } 76

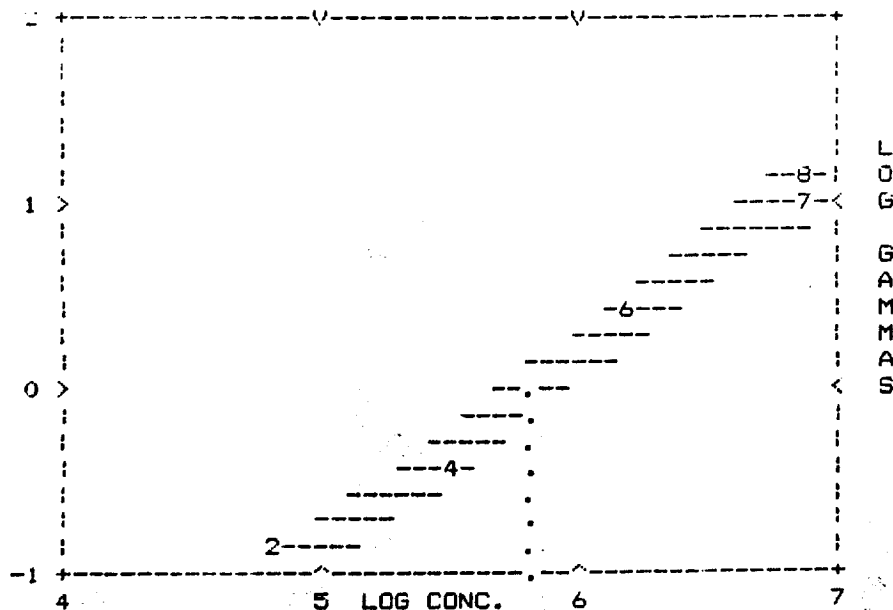
BLANK Ro/Rt= 93 / 60
BLANK RATIO= 0.6452

$$(1) \frac{G-obs}{(G-obs+1)} \times 100$$

EC 50 = 329.227 (302.939 TO 357.798)
= 330 (300 - 360) mg / L

P = 0.99426 SLOPE = 0.9539 INTERCEPT = +5.7967

##	RES.	PROB.
1	0.127	76
2	0.146	100
3	0.091	39
4	0.096	44
5	0.096	43
6	0.092	40
7	0.132	82
8	0.139	91



MICROTOX is a Registered Trade Mark of Microbics Corporation.

pg 3 of 4

MICROTOX (r) DATA SHEET

FC-787 15-MIN EXPOSURE 8/16/90 SAB

PAIR #	CONC.	I _o /I _t	G-OBS	G-EST	% Light Loss ⁽¹⁾	$\bar{x}$
1	125.000	99.0/ 39.0	0.447	0.456	31	32
2	125.000	93.0/ 36.0	0.472	0.456	32	32
3	250.000	92.0/ 26.0	1.017	0.995	50	49
4	250.000	93.0/ 28.0	0.893	0.995	47	49
5	500.000	101.0/ 17.0	2.386	2.168	70	70
6	500.000	97.0/ 17.0	2.252	2.168	69	70
7	11000.000	98.0/ 10.0	4.585	4.725	82	82
8	11000.000	98.0/ 10.0	4.585	4.725	82	82

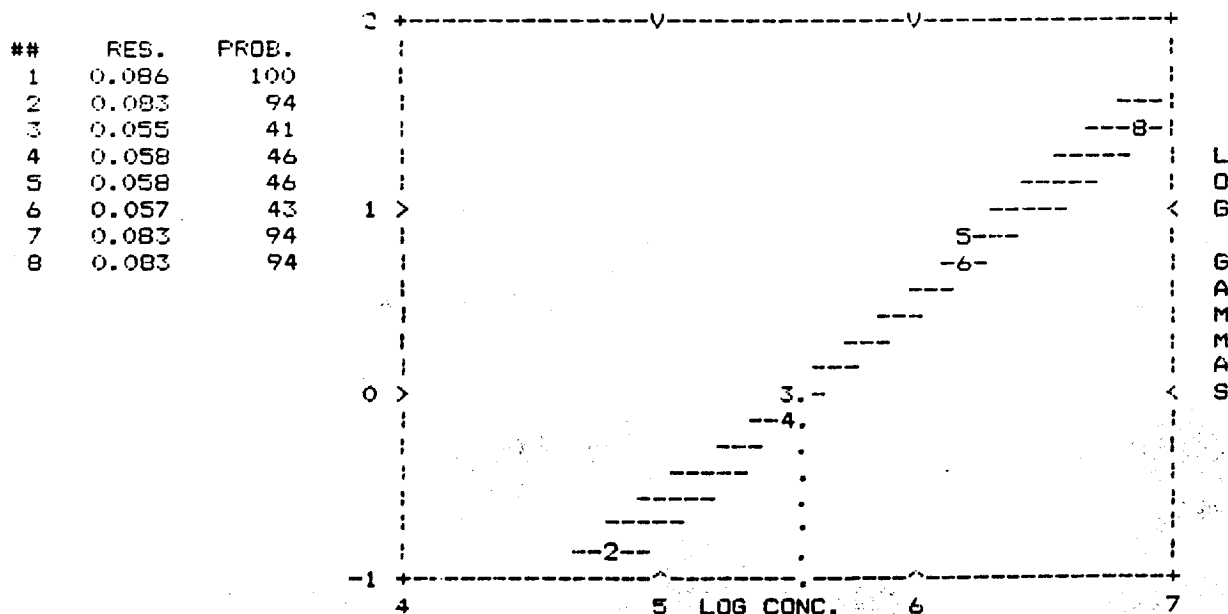
BLANK B_o/B_t= 93 / 53

BLANK RATIO= 0.5699

$$^{(1)} \frac{G_{\text{obs}}}{(G_{\text{obs}} + 1)} \times 100$$

EC 50 = 251.571 (237.987 TO 265.931)
= 250 (240-270) mg/L

R = 0.99784 SLOPE = 0.8858 INTERCEPT = +5.5277



MICROTOX is a Registered Trade Mark of Microbics Corporation.

pg 4 of 4

MICROTOX (P) DATA SHEET

FC-787 30-MINUTE EXPOSURE 8/16/90 SAB

PAIR #	CONC.	Io/It	G-OBS	G-EST	Light Loss ⁽¹⁾	$\bar{X}$
1	125.000	99.0/ 35.0	0.521	0.524	34	34
2	125.000	93.0/ 33.0	0.515	0.524	34	
3	250.000	92.0/ 22.0	1.248	1.207	56	54
4	250.000	93.0/ 24.0	1.083	1.207	52	
5	500.000	101.0/ 13.0	3.177	2.780	76	76
6	500.000	97.0/ 13.0	3.012	2.780	75	
7	%1000.000	98.0/ 8.0	5.586	6.405	85	86
8	%1000.000	98.0/ 7.0	6.527	6.405	87	

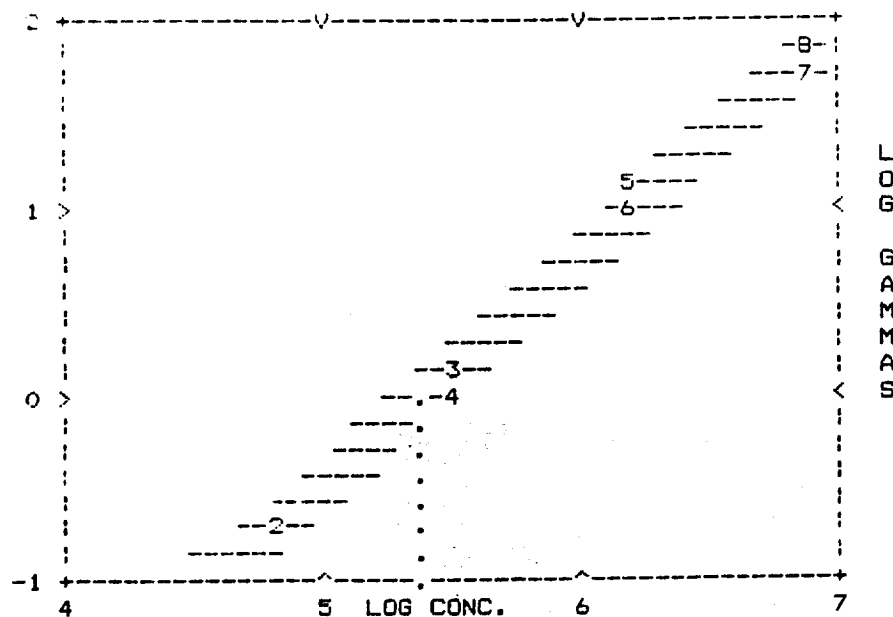
BLANK $B_0/B_t = 93 / 50$
BLANK RATIO = 0.5376

$$(1) \frac{G-OBS}{(G-OBS + 1)} \times 100$$

EC 50 = 214.768 (197.736 TO 233.268)
= 210 (200-230) mg/L

R = 0.99597 SLOPE = 0.9238 INTERCEPT = +5.3696

##	RES.	PROB.
1	0.116	99
2	0.117	100
3	0.075	41
4	0.080	46
5	0.081	47
6	0.079	45
7	0.108	85
8	0.117	100



MICROTOX is a Registered Trade Mark of Microbics Corporation.