

BOD/COD results for FC-99 (DEA salt of PFOS)

BIODEGRADATION

TEST SUBSTANCE

Identity: Perfluorooctanesulfonate, DEA salt; may also be referred to as PFOS DEA salt, FC-99, or 3M Sample No. 2. (1-Octanesulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptafluoro-, compd. with 2,2'-iminobis[ethanol] (1:1), CAS # 70225-14-8)

Remarks: Test sample is a mixture of the test substance in water (approximately 25% test substance and 75% water). All values reported relate to this mixture. No calculations were made to adjust for the actual concentration of the test substance in the test sample.

METHOD

Method: Not noted.

Type: Aerobic

GLP: No

Year completed: 1979

Contact time: 20 days

Innoculum: Sludge collected from an aeration basin at the municipal waste treatment plant in St. Paul, Minnesota.

RESULTS

5-day BOD:	44,000 mg/kg
20-day BOD:	82,000 mg/kg
COD:	78,200 mg/kg

Remarks: This material has a perfluorinated moiety and a non-fluorinated moiety. Current knowledge of these chemistries suggests that all biodegradation indicated in this study is likely due to reduction of the non-fluorinated moiety, 2,2'-iminobis[ethanol].

Testing was conducted on the "as-sold" mixture of the subject material in water (~24.5% subject material). The values reported apply to that mixture and not directly to the subject material.

CONCLUSIONS

This testing indicated that the 2,2'-iminobis[ethanol] moiety is likely to be biodegraded in aerobic environments capable of supporting biodegradation. This study cannot rule out the possibility that conditions could be found that would allow for biodegradation of the fluorochemical

moiety, nor could it exclude the possibility that a microorganism could eventually be enriched that could metabolically alter this chemical.

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

DATA QUALITY

Reliability: Klimisch ranking 3. This study lacks sufficient documentation, characterization of the test substance purity, and analytical measurement of test concentrations.

REFERENCES

This study was conducted by the 3M Company, Environmental Laboratory, Lab Request number 48955, 6/8/79.

OTHER

Last changed: 5/2/00

PRODUCT ECOLOGICAL ASSESSMENT
 REQUEST FOR LABORATORY WORK

Ref: ENVIR. ASSESS. INQ. #

LAB REQUEST NO. 48955

Comm. Chem. DIVISION
 PRODUCT: FC-99 (L-4309) F-6269-4
CS 295-7 Yellow, foamy liquid

REQUESTER

LABORATORY APD 6/11/79

Name: ANWelter Phone No. 5379
 Request Date: 5/4/79
 Project No.: 9970012600 Prob. No. _____
 Code No.: _____
 Sample Date: 5/4/79 Date Needed: ASAP
 Description: _____
 Purpose of Tests: Pre-lim Screen

Date Received Sample: 5-5-79
 Analyst: WAS, MTE
 Date Completed: 6-08-79
 Hours Spent: WAS-7, MTE-0 TOTAL=7
 Y _____ B _____ P _____
 Please Call Requester if Delays Are Encountered.

PHYSICAL & CHEMICAL PROPERTIES

Heat of Combustion Cal/G (BTU/Lb.)

Density

Ash

Other

WATER POLLUTION

pH

COD

BOD₅

BOD, Ultimate

TOC

GC

Oxygen Uptake

Dehydrogenase Activity (TTC)

Other

BIOASSAY

Specify Organism and Method:

96 h Static Fish

SENT TO ANALYTICAL BIO-CHEMISTRY LAB INC.
 RESULTS WILL BE REPORTED SEPARATELY.

LEACHATE FROM LEACHING TEST

pH

COD

BOD₅

BOD, Ultimate

TOC

GC

Bioassay

Other

OTHER

Bioaccumulation

Persistence

Degradation Products

LK# 48955

ULTIMATE BOD ENVIRONMENTAL LABORATORY DATA SHEET

COMPOUND: FC-99
ANALYST: W. A. Schind
DATE: 6-08-79

SAMPLE CONCENTRATION	BOD5 mg/kg	BOD15 mg/kg	BOD20 mg/kg
20 mg/l	51,000 ^①	56,000 ^①	97,000 ^①
40	42,000 ^①	44,000 ^①	77,000 ^①
80	38,000 ^①	46,000 ^①	71,000 ^①
160	43,000 ^①	> 44,000 ^③	—
500	> 15,000 ^③	—	—
AVERAGE =	44,000	49,000	82,000

GENERAL FOOTNOTES

- ① Values included in average.
- ② The less than '<' values were calculated by assuming a 2 mg/l DO depletion due to biochemical oxidation of the test compound for each dilution.
Calculation: $\text{<mg/l or mg/kg BOD} = \frac{2 \times 300}{\text{ml or grams per 300 ml dilution}}$
- ③ These dilutions had a residual DO of < 0.5 mg/l at the end of the incubation period. The greater than '>' values were calculated by assuming a residual DO of 1 mg/l at the end of the incubation period.
- ④ When comparing these dilutions to the seeded dilution water blanks, there are indications of inhibited biological action.

ENVIRONMENTAL LABORATORY

BOD WORK SHEET

Page No. 48755

Date: 5-18-79 W. A. Schindler

Dilution Water: 132

Seed: Pigeon Eye - 2 1/2' long

Bk. Avg.

Blanks:

Bottle No.	Sample Size ml	Description	INITIAL D.O.	AFTER INCUBATION	Depletion	5-Day BOD	Avg.
		FC-99					
		1.50g → 250ml*				mg/kg	
76	1.0		8.75	7.25		51,000	} 44,000
23	2.0		8.80	6.65		42,000	
64	4.0		8.80	5.25		38,000	
51	8.0		8.85	1.50		43,000	
96	25		8.80	40.5		>15,000	
* initial dilution with D.I. H₂O The greater than '5' values was were calculated by assuming a residual DO of 1mg/l at the end of the incubation period.							
W. A. Schind 5-23-79							

ENVIRONMENTAL LABORATORY

BOD WORK SHEET

File No. 48755

Date: 5-18-79 N.Y. School

Dilution Water: LSL

Seed: Big Eye - 2.4' inf.

Bk. Avg. _____

Blanks: _____, _____, _____, _____

[illegible]

W.A. Schulz
6-07-19

ENVIRONMENTAL LABORATORY BOD WORK SHEET

Page No. _____

Date: 5-18-79 W.G. SchildDilution Water: 18PSeed: Pigeon Eye - 2nd Inf

Bk. Avg. _____

Blanks: _____

Sample No.	Sample Size ml	Description	INITIAL D.O. AFTER INCUBATION	Depletion	5 - Day BOD	Avg.
23	—	Unseeded Dilution	8.95 8.70	0.25		
61	—	H ₂ O Blanks	8.90 8.60	0.30		
95	—		8.85 8.55	0.30		
92	—		8.90 8.45	0.45		
		AVG. DEPLETION =		0.325		
22	—	Seeded Dilution	8.90 8.35			
134	—	H ₂ O Blanks	8.90 8.45			
2	—	3ml/l	8.90 8.30			
799	4.9	Seed Controls	8.90 7.80			
81	8.9	(1ml seed per 300ml)	8.80 7.00			
9	13	unseeded dilution	8.80 6.10			
83	17	H ₂ O)	8.70 5.30			
		40% - 70% depletion	used for calculating seed correction value = 3.5 - 6.15 mg/l DO residual			
87	2	BOD STD. 10	8.90 7.00		210 mg/l	
94	4	150mg Glucose	8.90 5.55		220	
73	5	and 150mg	8.90 4.70		220	
78	6	Glutamic Acid	8.90 3.85		230	
		per 1 liter.				
		Lab Request Nos.				
		48965				
		48955				
		48545				
		48925				
		48945				
		48935				
		48535				

W.G. Schild
5-23-79

ENVIRONMENTAL LABORATORY BOD WORK SHEET

Page No. _____
Date: 5-18-79 W.A. Sch
Dilution Water: 18P
Seed: Pige Eye-2nd Day
Bk. Avg. _____

Blanks: _____

Bottle No.	Sample Size ml	Description	INITIAL D.O. AFTER INCUBATION	Depletion	13 - Day BOD	Avg.
23	—	Unseeded Dilution	8.95 8.50	0.45		
61	—	H ₂ O Blanks	8.90 8.35	0.55		
95	—		8.85 8.30	0.55		
92	—		8.90 8.25	0.65		
		avg. depletion =	0.55			
22	—	Seeded Dilution	8.90 8.10	0.80		
134	—	H ₂ O Blanks	8.90 8.20			
2	—	3ml/l	8.90 8.10			
799	4.9	Seed Controls	8.90 7.45			
81	8.9	(ml seed per 300ml)	8.80 6.10			
1	13	unseeded dilution	8.80 4.30			
83	17	H ₂ O)	8.70 1.60			
87	2	BOD STD. 10	8.90 6.40		250 mg/l	
94	4	150mg Glucose	8.90 4.75		250	
73	5	and 150mg	8.90 3.90		250	
78	6	Glutamic Acid per 1 liter.	8.90 3.10		250	
		Lab Request Nos.				
		48965				
		48955				
		48545				
		48925				
		48945				
		48935				
		48535				

W.A. Sch
5-31-79

ENVIRONMENTAL LABORATORY BOD WORK SHEET

Page No. _____

Date: 5-18-79 W.A. SchindDilution Water: 18PSeed: Pige Eye-2nd Inf

Bk. Avg. _____

Blanks: _____

tile No.	Sample Size ml	Description	INITIAL D.O. AFTER INCUBATION	Depletion	20 - Day BOD	Avg.
23	—	Unseeded Dilution	8.95 7.25	1.7		
61	—	H ₂ O Blanks	8.90 7.60	1.3		
95	—		8.85 7.30	1.55		
92	—		8.90 7.80	1.1		
		avg. depletion =	1.4125			
22	—	Seeded Dilution	8.90 6.45			
134	—	H ₂ O Blanks	8.90 6.55			
2	—	3ml/d	8.90 6.55			
799	4.9	Seed Controls	8.90 5.45			
81	8.9	(ml seed per 300ml)	8.80 3.90			
	13	unseeded dilution	8.80 2.00			
83	17	H ₂ O	8.70 —			
87	2	BOD STD. 10	8.90 4.65			
94	4	150mg Glucose	8.90 2.60			
73	5	and 150mg	8.90 1.65			
78	6	Glutamic Acid	8.90 0.65			
		per 1 liter.				
		Lab Request Nos.				
		4896 S				
		4895 S				
		4854 S				
		4892 S				
		4894 S				
		4893 S				
		4853 S				

W.A. Schind
6-07-79