

BIODEGRADATION (BOD/COD)

TEST SUBSTANCE

Identity: A mixture containing perfluorooctanesulfonate; which may also be referred to as PFOS, FC-95, or as a component of FX-3106. (1-Octanesulfonic acid) (CAS # 2795-39-3).

Remarks: The 3M production lot number was 015G. The test sample is FX-3106, PO# S5233-004, EAI 85548, Sumitomo 3M Japan. Current information indicates it is a mixture of 2.31% PFOS, 2.6% diethylene glycol butyl ether, 83.38% water, 10% ethylene glycol, 1.36% Sultone foamer, 0.2% xanthan gum, 0.1% 2-biphenylol, sodium salt, tetrahydrate, and 0.05% benzotriazole.

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

METHOD:

Method: Standard methods.
Type: Aerobic
GLP: No
Year completed: 1985
Contact time: 20 days
Inoculum: Stale sewage, Chemolite.

RESULTS

Chemical Oxygen Demand (COD): 220,000 mg/kg
240,000 mg/kg (Replicate)

Carbonaceous-Biochemical Oxygen Demand (BOD):

5-Day:	4,700 mg/kg
10-Day:	63,000 mg/kg
20-Day:	72,000 mg/kg

CONCLUSIONS

No conclusions given.

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 inoculum was not properly characterized. There is no characterization of the test substance purity, 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 C2282, 1985.

OTHER

Last changed: 6/26/00

11-25-85

ENVIRONMENTAL LABORATORY FINAL REPORT

LAB REQUEST NO. C2282

REQUESTER NAME: EAR/MTE
DEPT: 0535
PROJECT NO: 9973010100
DATE RECEIVED: 10-24-85
DESC: FX-3106 LIGHT WATER-ENVIRONMENTAL SCREEN

CONTRACT LAB:
CONTRACT LAB COST: 0
3M E-L HOURS: 10
EST CMPLT DATE: 11-29-85
DATE COMPLETED: 11-26-85

PO #S5233-004 FOR SUMITOMO 3M EAI 85548.

SAMPLE	DATE	CODE	DESCRIPTION	TEST	RESULT
1		FX3106	LOT 0156		
			BOD-05 (CARBONACEOUS)		4700 MG/KG
			BOD-10 (CARBONACEOUS)		63000 MG/KG
			BOD-20 (CARBONACEOUS)		72000 MG/KG
			COD (DICHROMATE REFLUX)		220000 MG/KG
			FISH ACUTE TEST		COMPLETE
2			DUP OF #1		
			COD (DICHROMATE REFLUX)		240000 MG/KG

* = CONTRACT LAB

SUBMITTED BY

K. H. Zeman

DATED

11-26-85

Environmental Laboratory BOD Work Sheet -
 Checks, Controls, and Standards
 19755 - A - PWO

3M

Lab Req. No. ▶ C 2282, C 2314		BOD Run No. ▶ 85-57	
Analyst <i>K. Stet</i>		Date Started 11-1-85	
Seed Type & Source <i>St. L. Sew. / Ch. 16</i>		Seed Concentration <i>6 ml / L</i>	
Nitrification Inhibitor Conc. <i>10.13g / 19L</i>		Distilled Water (Y) N	
Analyst <i>K. Stet</i>		Date 11-6-85	
Incubator Temp. <i>0C</i>		Date 11-1	Temp. 20.3
		Date 11-6-85	Temp. 20.4

Nonseeded Dilution - Water Blank

Bottle No.	Initial D.O. (A ₁)	Present D.O. (A ₂)	D.O. Depletion (A ₁ - A ₂)	Average D.O. Depletion ($\bar{A}_1 - \bar{A}_2$)
13	8.40	8.15	0.25	0.18
8 B	8.35	8.20	0.15	
68	8.80	8.65	0.15	

Seeded Dilution - Water Blank (optional)

Bottle No.	Initial D.O. (C ₁)	Present D.O. (C ₂)	D.O. Depletion (C ₁ - C ₂)	Average D.O. Depletion ($\bar{C}_1 - \bar{C}_2$)
79	8.45	8.20	0.25	0.22
87	8.50	8.30	0.20	
69 B	8.70	8.50	0.20	

Seed Controls

Bottle No.	Sample Size	Initial D.O. (B ₁)	Present D.O. (B ₂)	D.O. Depletion (B ₁ - B ₂)
73	20	8.30	7.40	0.90
115	40	8.10	7.10	1.00
79B	80	7.50	6.10	1.40

Glucose - Glutamic Acid Standard

Bottle No.	Sample Size	Initial D.O. (D ₁)	Present D.O. (D ₂)	Total D.O. Depletion (D ₁ - D ₂)	Depletion Due To Standard	$\frac{5}{\text{BOD}}$ Day	Average $\frac{5}{\text{BOD}}$ Day
33	3	8.45	7.15	2.30	2.09	209	210.3 report 210
59	5	8.45	4.70	3.75	3.54	212	
51	7	8.55	3.45	5.10	4.89	210	

Potassium Hydrogen Phthalate Standard (optional)

Bottle No.	Sample Size	Initial D.O. (D ₁)	Present D.O. (D ₂)	Total D.O. Depletion (D ₁ - D ₂)	Depletion Due To Standard	$\frac{5}{\text{BOD}}$ Day	Average $\frac{5}{\text{BOD}}$ Day

MM 18756 - A - PWMO

3M

Sample Description	
Initial Dilution	_____ of Sample diluted to _____ ml with DI water
Initial Dilution Factor	_____/_____ (Dilution factor = 1 if undiluted)

[illegible]

Comments

Environmental Laboratory BOD Work Sheet -
 Checks, Controls, and Standards
 19755 - A - PWO

3M

Lab Req. No. ▶ C2282, C2314		BOD Run No. ▶ 85-57	
Analyst <i>K. S. S.</i>		Date Started 11-1-85	
Seed Type & Source <i>St. C. S. / Ch. 16</i>		Seed Concentration <i>6 ml / L</i>	
Nitrification Inhibitor Conc. <i>10.13g / 19L</i>		Distilled Water <i>(Y)</i> N	
Analyst <i>K. S. S.</i>		Date 11-11-85	
Incubator Temp. <i>OC</i>		Date <i>11-1</i>	Temp. <i>20.3</i>
		Date <i>11-11</i>	Temp. <i>20.2</i>

Nonseeded Dilution - Water Blank

Bottle No.	Initial D.O. (A ₁)	Present D.O. (A ₂)	D.O. Depletion (A ₁ - A ₂)	Average D.O. Depletion ($\bar{A}_1 - \bar{A}_2$)
13	8.40	8.00	0.40	0.38
88	8.35	8.00	0.35	
12	8.80	8.40	0.40	

Seeded Dilution - Water Blank (optional)

Bottle No.	Initial D.O. (C ₁)	Present D.O. (C ₂)	D.O. Depletion (C ₁ - C ₂)	Average D.O. Depletion ($\bar{C}_1 - \bar{C}_2$)
79	8.45	7.80	0.65	0.73
87	8.50	7.75	0.75	
69B	8.70	7.90	0.80	

Seed Controls

Bottle No.	Sample Size	Initial D.O. (B ₁)	Present D.O. (B ₂)	D.O. Depletion (B ₁ - B ₂)
73	20	8.30	7.15	1.15
115	40	8.10	6.70	1.40
79B	80	7.50	5.50	2.00

Glucose - Glutamic Acid Standard

Bottle No.	Sample Size	Initial D.O. (D ₁)	Present D.O. (D ₂)	Total D.O. Depletion (D ₁ - D ₂)	Depletion Due To Standard	10 Day BOD	Average 10 Day BOD
73	3	8.45	5.60	2.85	2.12	212	214 mg / L
59	5	8.45	4.15	4.30	3.58	215	
51	7	8.55	2.55	5.70	4.98	214	

Potassium Hydrogen Phthalate Standard (optional)

Bottle No.	Sample Size	Initial D.O. (D ₁)	Present D.O. (D ₂)	Total D.O. Depletion (D ₁ - D ₂)	Depletion Due To Standard	10 Day BOD	Average 10 Day BOD

JOHN 18754 - A - PWK.

3M

Sample Description	
Initial Dilution	_____ of Sample diluted to _____ ml with DI water
Initial Dilution Factor	_____ (Dilution factor = 1 if undiluted)

Note:

1. Conc. = Concentration of sample (mg/l or mg/l) in BOD bottles.
2. Sample Size = ml of sample or diluted sample added to BOD Bottle.
3. Samples with $D_1 \geq 1$ and $DDS \geq 2$ used to calculate average BOD.

Comments

Environmental Laboratory BOD Work Sheet -
 Tests, Controls, and Standards
 19755 - A - PWO

3M

Lab Req. No. ▶ C 2282, C 2314		BOD Run No. ▶ 85-57	
Analyst <i>K. S. S.</i>		Date Started 11-1-85	
Seed Type & Source <i>St. C. S. / Ch. H. 6 ml / 6</i>		20 - Day BOD Readings	
Seed Concentration		Analyst <i>K. S. S.</i>	
Nitrification Inhibitor Conc. 10.13g / 115.4		Date 11-21-88	
Distilled Water (Y) N		Incubator Temp. 20.3	Date 11-21
		Temp. 20.3	Temp. 20.5

Nonseeded Dilution - Water Blank

Bottle No.	Initial D.O. (A ₁)	Present D.O. (A ₂)	D.O. Depletion (A ₁ - A ₂)	Average D.O. Depletion (A ₁ - A ₂)
13	8.40	7.90	0.50	0.48
8 B	8.35	7.85	0.50	
6.8	8.80	8.35	0.45	

Seeded Dilution - Water Blank (optional)

Bottle No.	Initial D.O. (C ₁)	Present D.O. (C ₂)	D.O. Depletion (C ₁ - C ₂)	Average D.O. Depletion (C ₁ - C ₂)
79	8.45	7.70	0.75	0.82
87	8.50	7.70	0.80	
69 B	8.70	7.80	0.90	

Seed Controls

Bottle No.	Sample Size	Initial D.O. (B ₁)	Present D.O. (B ₂)	D.O. Depletion (B ₁ - B ₂)
73	20	8.30	7.00	1.30
115	40	8.10	6.30	2.20
790	80	7.50	4.50	3.00

Glucose - Glutamic Acid Standard

Bottle No.	Sample Size	Initial D.O. (D ₁)	Present D.O. (D ₂)	Total D.O. Depletion (D ₁ - D ₂)	Depletion Due To Standard	20 - Day BOD	Average 20 - Day BOD
33	3	8.45	5.45	3.00	2.19	219	219
54	5	8.45	4.00	4.45	3.65	219	
51	7	8.55	2.65	5.90	5.10	219	

Potassium Hydrogen Phthalate Standard (optional)

Bottle No.	Sample Size	Initial D.O. (D ₁)	Present D.O. (D ₂)	Total D.O. Depletion (D ₁ - D ₂)	Depletion Due To Standard	20 - Day BOD	Average 20 - Day BOD

Form 19756-A-PWD

3M

Sample Description	
Initial Dilution	_____ of Sample diluted to _____ ml with DI water
Initial Dilution Factor	_____ (Dilution factor = 1 if undiluted)

[illegible]

Comments