

BIODEGRADATION (BOD/COD)

TEST SUBSTANCE

Identity: Perfluorooctanoic acid, ammonium salt; may also be referred to as PFOA ammonium salt, Ammonium perfluorooctanoate, PFO, FC-116, FC-126, FC-169, or FC-143. (Octanoic acid, pentadecafluoro-, ammonium salt, CAS # 3825-26-1)

Remarks: The 3M production lot number was 37. The test sample is FC-143. It's purity was not sufficiently characterized, though current information indicates it is a mixture of 96.5 - 100% test substance and 0 - 3.5% C₆, C₇, and C₉ perfluoro analogue compounds.

METHOD:

Method: Not noted.

Type: Aerobic

GLP: No

Year completed: 1980

Contact time: 20 days

Inoculum: Sewage taken from the treatment system at 3M Chemolite, Cottage Grove, MN. .

RESULTS

Chemical Oxygen Demand (COD): 570 - 870 mg/kg*

Biochemical Oxygen Demand (BOD):

5-Day: <38 mg/kg

10-Day: <38 mg/kg

20-Day: <38 mg/kg

* Two tests were conducted. The raw data sheets are not available. The summary sheet states "a fraction of the sample went up into the condenser each time, so the results are not consistent when run in duplicate".

CONCLUSIONS

No reliable conclusions can be derived from this study.

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 is not properly characterized. There is no

analytical measurement of the test substance in the solutions. Test substance was not characterized for purity.

REFERENCES

The COD and BOD studies were conducted the 3M Company, Environmental Laboratory, St. Paul, MN, Lab Request number 5625S, 1980.

OTHER

Last changed: 5/24/00

003684

PRODUCT ECOLOGICAL ASSESSMENT
REQUEST FOR LABORATORY WORK

3M Action 200 P

Ref: ENVIR. ASSESS. INQ. # 80201

LAB REQUEST NO. 56255

Commercial Chem DIVISION
PRODUCT: FC-143 Lot -37
CC 804-3

REQUESTER

Name: Eric A Reiner Phone No. 5079
Request Date: April 11, 1980
Project No.: 9970012600 Prob. No.
Code No.:
Sample Date: 4-11-1980 Date Needed:
Description: FC-143 Lot 37
Purpose of Tests: Env Screen + to confirm existing data.

LABORATORY

Date Received Sample: 4-21-80
Analyst: MRL, MTE, WAS
Date Completed: 6-5-80
Hours Spent: HR-9, WAS-2, MTE-16
Y B P
Please Call Requester If Delays Are Encountered.

27 HR
TOTAL

PHYSICAL & CHEMICAL PROPERTIES

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

Density

Ash

Other

FC-143
LOT 37

WATER POLLUTION

~~pH~~ COD dup *

COD

BOD₅

BOD, Ultimate

TOC

GC

Oxygen Uptake

Dehydrogenase Activity (TTC)

Other

570 mg/kg
870 mg/kg
X
X
X
538 mg/kg
538 mg/kg

X (See attached graph and data sheet) W.A. Schuler
6-06-80

BIOASSAY

Specify Organism and Method:

ISE Fathead minnow

combined

X 766 (743-789)
mg/l

LEACHATE FROM LEACHING TEST

pH

COD

BOD₅

BOD, Ultimate

TOC

GC

Bioassay

Other

OTHER

Bioaccumulation

Persistence

Degradation Products

003685

* A portion of the sample went up to the confusers each time, so the results are not consistent when run in duplicate.

Request No. #	56255	BOD Run No. #	80-17
at	M. Roberts	Date Started	4-25-80
Type & Source	Amesbury - Sewage	Seed Concentration	6 ml / 10
		Analyst	M. Roberts
		Date	4/30/80

needed 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 ($\bar{A}_1 - \bar{A}_2$)
120	8.70	8.05	0.65	
9	8.50	8.05	0.45	
123	8.50	8.00	0.50	0.53

needed 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 ($\bar{C}_1 - \bar{C}_2$)
21	9.00	8.45	0.55	
3	8.85	8.45	0.40	
128	9.00	8.50	0.50	0.48

Seed Controls

Bottle No.	Sample Size	Initial D.O. (B ₁)	Present D.O. (B ₂)	D.O. Depletion (B ₁ - B ₂)
144	20	8.45	7.75	0.70
21	40	8.30	7.35	0.95
93	60	7.90	7.00	0.90
6	120	7.25	5.65	1.60 ← used to calc

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	5 Day BOD	5 Average Day BOD
15	3.0	8.90	6.65	2.25	1.71	171	
1	5.0	8.95	5.20	3.75	3.21	193	200 *
79	7.0	8.90	3.40	5.50	4.97	213	200 *

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	5 Day BOD	5 Average Day BOD

Request No. $\blacklozenge$		BOD Run No. $\blacklozenge$ 80-17	
Analyst <i>M. Roberts</i>	Date Started 4-25-80	10 Day BOD Readings	
Seed Type & Source <i>Chemicals - Sewage</i>	Seed Concentration <i>6.0 ml / 10</i>	Analyst <i>M. Roberts</i>	Date 5-5-80

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 ($\bar{A}_1 - \bar{A}_2$)
120	8.70	7.95	0.75	0.62
9	8.50	8.00	0.50	
123	8.50	7.90	0.60	

cont.

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 ($\bar{C}_1 - \bar{C}_2$)
21	9.00	8.40	0.60	0.57
3	8.85	8.40	0.45	
128 ml	9.00	8.35	0.65	

Seed Controls

Bottle No.	Sample Size	Initial D.O. (B ₁)	Present D.O. (B ₂)	D.O. Depletion (B ₁ - B ₂)
144	20	8.45	7.45	1.00
21	40	8.30	6.80	1.50
93	60	7.90	6.05	1.85
6	120	7.25	4.55	2.70

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	Day BOD	Average Day BOD
15	3.0	8.90	6.25	2.65			
1	5.0	8.95	4.45	4.50			
74	7.0	8.90	2.40	6.50			

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	Day BOD	Average Day BOD

Request No. Φ		BOD Run No. Φ 80-17	
Analyst <i>M. Roberts</i>		Date Started 4-25-80	
Sample Type & Source <i>Handile - Sewage</i>		20 - Day BOD Readings	
Total Concentration <i>6001/0</i>		Analyst <i>M. Roberts</i>	
		Date 5/15/80	

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 ($\bar{A}_1 - \bar{A}_2$)
120 -	8.70	6.75	1.95	1.55
9 -	8.50	7.75	0.75	
123 -	8.50	6.55	1.95	

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 ($\bar{C}_1 - \bar{C}_2$)
21 -	9.00	6.80	2.20	2.13
3 -	8.85	8.6.85	2.00	
128 -	9.00	6.80	2.20	

Seed Controls

Bottle No.	Sample Size	Initial D.O. (B ₁)	Present D.O. (B ₂)	D.O. Depletion (B ₁ - B ₂)
444	20	8.45	4.20	4.25
21	40	8.30	2.50	5.80
93	60	7.90	0.70	7.20
6	120	7.25	<0.5	

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	— Day	* Average — Day
15	3.0	8.90	4.10	4.80			
1	5.0	8.95	2.45	6.50			
79	7.0	8.90	<0.5				

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	— Day	Average — Day

sample Description	
FC-143	
Initial Dilution	_____ of Sample diluted to _____ ml with DI water
Initial Dilution Factor	_____ (Dilution factor = 1 if undiluted)

[illegible]

Comments
sample formed when stirred
* A "less than" value was calculated using the largest sample size since there was insufficient depletion (< 2.0) as recommended for accurate BOD values.

Sample Description		FC-143
Initial Dilution	_____ of Sample diluted to _____ ml with DI water	
Initial Dilution Factor	_____ (Dilution factor = 1 if undiluted)	

Bottle No.	Cnno. of Sample ¹	Sample Size ²	Initial D.O. (D_1)	Present D.O. (D_2)	Total D.O. Depletion ($D_1 - D_2$)	Depletion Due To Sample	$\frac{20}{BOD}$ · Day	$\frac{20}{Average BOD}$ · Day
77		20g	9.25	8.55				* = 38 mg/kg
90		40g	9.20	8.55				
91		80g	9.10	8.45				
50		160g	8.90	8.10				

Note:

1. **Conc.** = Concentration of sample (ml/l or mg/l) in BOD bottles.
2. **Sample Size** = ml or g of sample or diluted sample added to BOD Bottle.

Comments

Imps formed when stirred

* See 5-day comments