

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 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 biodegradability of the fluorochemical component of the test sample.

METHOD:

Method: Not noted.
Type: Aerobic
GLP: No
Year completed: 1994
Contact time: 28 days
Inoculum: Not given.

RESULTS

Chemical Oxygen Demand (COD):	276,000 mg/kg
Biochemical Oxygen Demand (BOD):	
5-Day:	47,700 mg/kg
20-Day:	230,000 mg/kg
28-Day:	296,000 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. 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 Pace, Inc., of Minneapolis, MN at the request of the 3M Company, Lab Request number M1655, 1994.

OTHER

Last changed: 6/26/00

DATE: 03/31/1994

3M ENVIRONMENTAL LABORATORY
CONTRACT LABORATORY WORK ORDER BY PARAMETER

LAB REQUEST NO. M1655

CONTRACT LAB : pace

PROJECT LEAD: SA BEACH

PROJECT NUMBER : BILTMENVIR

TELEPHONE : 612-778-7452

SHIP DATE : 3/31/94

FAX : 612-778-6176

Computer Code	Test Name	Sample Numbers	Sample Available Date	Result Due Date
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COD	COD	1	03/31/1994	04/13/1994
P-CBOD-05	BOD-05 (CARBONACEOUS)	1	03/31/1994	04/12/1994
P-CBOD-20	BOD-20 (CARBONACEOUS)	1	03/31/1994	05/03/1994
P-CBOD-28	BOD-28 (CARBONACEOUS)	1	03/31/1994	05/16/1994

Biochemical Oxygen Demand

BOD-05 ✓

CBOD-05 ✓

Date/Time In 4/6/94 1530

Date/Time Out 4/13/94

Analyst KNO/JGS

Reviewed Jmc 4.19.94

Samples BOD and CBOD	Analysis		Comments	pH	Seed Vol (mL)	Samp Vol (mL)	Add Inhib. (CBOD)	Bottle #	D1	D2	DO DROP (D1-D2)	BOD
	Results	Units										
Blank	0.7	mg/L			0	NA	No	5	7.8	7.1	0.7	
Blank					0	NA	No	72	7.8	7.1	0.7	
Seed Control	4.45				25	25	No	21	7.7	3.4	4.3	
Seed Control					25	25	No	115	7.9	3.3	4.6	
Seed Control			Inhibited		25	25	Yes	22	7.9	5.2	2.7	
Seed Control			Inhibited		25	25	Yes	50	7.9	5.2	2.7	
LCS	162		TV198 ± 31		2	6	No	300	7.8	4.2	3.6	142.2
LCS			TV198 ± 31		2	6	No	44	7.9	4.3	3.6	162.2
7037.8 AD Reset 4-7-94			1000 x	7	2	0.025	YES	32	7.9	6.7	1.2	-
					2	0.015		25	7.9	6.7	1.2	-
					2	0.007		116	7.8	6.9	0.9	-
					2	0.005		16	7.8	6.8	1.0	-
					2	0.003		35	7.8	6.8	1.0	-
					2			7				
1086.1 MI655 47700	34 ^① 34* 476 ^① 47700	mg/kg		↓	2	0.02		13	7.6	6.1	-	- ^①
					2	0.015		20	7.8	5.2	2.6	33.8
					2	0.002		47	7.8	5.8	2.0	-
					2	0.005		47A	7.8	6.2	1.6	-
					2	0.003		154	7.9	6.2	1.7	-
					2							

$$\text{Seed Correction} = \left(\frac{\text{Seed Control DO Drop}}{4.45} \right) \left(\frac{300 \text{ mL}}{\text{Seed Control Vol (mL)}} \right) \left(\frac{2 \text{ mL}}{300 \text{ mL}} \right) = 0.354$$

$$\text{Inhibited Seed Correction} = \left(\frac{\text{Inhib. Seed Control DO Drop}}{0.7} \right) \left(\frac{300 \text{ mL}}{\text{Inhib. Seed Control Vol (mL)}} \right) \left(\frac{2 \text{ mL}}{300 \text{ mL}} \right) = 0.216$$

$$\text{BOD (mg/L or mg/kg)} = \frac{((D1 - D2) - \text{Seed Correction}) \times 300 \text{ mL}}{\text{sample wt. or vol.}}$$

$$\text{CBOD (mg/L or mg/kg)} = \frac{((D1 - D2) - \text{Inhib. Seed Correction}) \times 300 \text{ mL}}{\text{sample wt. or vol.}}$$

D2 must be > 1.0

DO DROP must be > 2.0

Seed Lot No. 8/94

Incubator No. 2

Batch No. 32975-002-07

Dup No. _____

LCS No. _____

pace, Inc.®

MININORG FORM MN3073

Jmc 4.19.94

Biochemical Oxygen Demand

BOD-
CBOD 2.0 ✓

Date/Time In 4/8/94 1630

Date/Time Out 4/28/94

Analyst KAB

Reviewed JMC 4-29-94

Samples BOD and CBOD	Analysis		Comments	pH	Seed Vol (mL)	Samp Vol (mL)	Add Inhib. (CBOD)	Bottle #	D1	D2	DO DROP (D1-D2)	BOD
	Results	Units										
Blank		mg/L			0	NA	No	38	7.8	6.8		
Blank					0	NA	No	28	7.8	6.9		
Seed Control					25	25	No					
Seed Control					25	25	No					
Seed Control			Inhibited		25	25	Yes	52	8.06	2.4	6.2	
Seed Control			Inhibited		25	25	Yes	42	8.86	2.2	6.4	
LCS			TV198 ± 31		2	6	No					
LCS			TV198 ± 31		2	6	No					
7037.8 <i>Rest</i> 4-21-94					2	0.02	YES	37	7.8	6.0	1.8	
					2	0.015		187	7.9	6.2	1.7	
					2	0.007		74	7.9	6.7	1.2	
					2	0.005		181	8.0	6.8	1.2	
					2	0.003		24	7.9	6.9	1.0	
					2							
686.1 M1655	230,000				2	0.02		1	8.0	<1		
					2	0.015		18	7.9	<1		
					2	0.007		71	8.0	6.7	1.3	
					2	0.005		38	7.9	3.8	4.1	215,760
					2	0.003		13	8.0	5.1	2.9	239,600
					2							

$$\text{Seed Correction} = \left(\frac{\text{Seed Control DO Drop}}{\left(\frac{300 \text{ mL}}{\text{Seed Control Vol (mL)}} \right)} \right) \left(\frac{2 \text{ mL}}{300 \text{ mL}} \right) = \underline{\hspace{2cm}}$$

$$\text{Inhibited Seed Correction} = \left(\frac{\text{Inhib. Seed Control DO Drop}}{6.3} \right) \left(\frac{300 \text{ mL}}{\text{Inhib. Seed Control Vol (mL)}} \right) \left(\frac{2 \text{ mL}}{300 \text{ mL}} \right) = \underline{0.504}$$

$$\text{BOD (mg/L or mg/kg)} = \frac{((D1-D2) - \text{Seed Correction}) \times 300 \text{ mL}}{\text{sample wt. or vol.}}$$

$$\text{CBOD (mg/L or mg/kg)} = \frac{((D1-D2) - \text{Inhib. Seed Correction}) \times 300 \text{ mL}}{\text{sample wt. or vol.}}$$

D2 must be > 1.0

DO DROP must be > 2.0

Seed Lot No. 8/94

Incubator No. 1

Batch No. 1052632

Dup No.

LCS No.

pace, Inc.®

MNINORG FORM MN3073

Biochemical Oxygen Demand

BOD-
CBOD-25 ✓

Date/Time In 4/8/94 1630

Date/Time Out 5/6/94

Analyst KRB

Reviewed JMC 5-10-94

Samples BOD and CBOD	Analysis		Comments	pH	Seed Vol (mL)	Samp Vol (mL)	Add Inhib. (CBOD)	Bottle #	D1	D2	DO DROP (D1-D2)	BOD
	Results	Units										
Blank		mg/L			0	NA	No	86	7.8	6.9	0.9	
Blank					0	NA	No	169	7.8	7.0	0.8	
Seed Control					25	25	No					
Seed Control					25	25	No					
Seed Control			Inhibited		25	25	Yes	44	8.7	5.93	5.3	
Seed Control			Inhibited		25	25	Yes	9	8.7	6.12	6.2	
LCS			TV198 ± 31		2	6	No					
LCS			TV198 ± 31		2	6	No					
7037.8 21,600 mg/kg 4/8/94 mic55	21,600 mg/kg				2	0.02	YES	55	7.8	4.0		
					2	0.015		89	7.8	<1		
					2	0.007		40	7.8	<1		
					2	0.005		54	7.7	3.1	4.6	245.00*
					2	0.003		42	7.8	3.9	4.3	244.00*
					2							
7037.8 21,600 mg/kg	21,600 mg/kg				2	0.02		26	7.8	5.9	1.9	21600
					2	0.015		23	7.8	6.1	1.7	
					2	0.007		101	7.8	6.4	1.4	
					2	0.005		107	7.8	6.6	1.2	
					2	0.003		43	7.8	6.9	0.9	
					2							

$$\text{Seed Correction} = \left(\frac{\text{Seed Control DO Drop}}{300 \text{ mL}} \right) \left(\frac{2 \text{ mL}}{300 \text{ mL}} \right) = \frac{5.75}{300} \times \frac{2}{300} = 0.4$$

$$\text{Inhibited Seed Correction} = \left(\frac{\text{Inhib. Seed Control DO Drop}}{300 \text{ mL}} \right) \left(\frac{2 \text{ mL}}{300 \text{ mL}} \right) = \frac{5.75}{300} \times \frac{2}{300} = 0.46$$

$$\text{BOD (mg/L or mg/kg)} = \frac{((D1-D2) - \text{Seed Correction}) \times 300 \text{ mL}}{\text{sample wt. or vol.}}$$

$$\text{CBOD (mg/L or mg/kg)} = \frac{((D1-D2) - \text{Inhib. Seed Correction}) \times 300 \text{ mL}}{\text{sample wt. or vol.}}$$

D2 must be > 1.0

DO DROP must be > 2.0

Seed Lot No. 8/94

Incubator No. #1

Batch No. 52967

Dup No.

LCS No.

pace, Inc.®

MNINORG FORM MN3073

5.6.94

5-5-94