

BIODEGRADATION (BOD/COD)

TEST SUBSTANCE

Identity: Mixture containing perfluorooctanesulfonate which may also be referred to as PFOS, FC-95, or as a component of FC-203FC. (1-Octanesulfonic acid) (CAS # 2795-39-3).

Remarks: The 3M production lot number was not noted. The test sample is FC-203FC, identified by the laboratory as R1335. Current information indicates it is a mixture of 0.85% PFOS, 17% diethylene glycol butyl ether, 74.46% water, 2.34% acrylic foamer, 1.7% alkyl ether sulfate, 2.55% sodium octyl sulfate, 0.12% sodium nitrite, 0.09% sodium molybdate, 0.85% triethanolamine, and 0.04% tolyltriazole.

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

METHOD:

Method: OECD Guideline 301D

Type: Aerobic

GLP: No

Year completed: 1997

Contact time: 28 days

Inoculum: Polyseed NX, Lot D257, Polybac Corporation, Bethlehem, PA.

RESULTS

Chemical Oxygen Demand (COD): 447,000 mg/kg

Biochemical Oxygen Demand (CBOD):

	<u>Replicate 1</u>	<u>Replicate 2</u>
5-Day:	<95,000 mg/kg	<95,000 mg/kg
10-Day:	199,500 mg/kg	224,800 mg/kg
20-Day:	294,900 mg/kg	274,800 mg/kg
28-Day:	301,500 mg/kg	290,000 mg/kg

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

No conclusions given.

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

DATA QUALITY

Reliability: Klimisch ranking = 2. This 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 solution.

REFERENCES

This test was conducted by AScl Corporation, Duluth Environmental Testing Division, Duluth, MN at the request of the 3M Company, Lab Request number R1335, 1997.

OTHER

Last changed: 6/26/00

R1335 BOD REPORT FOR 3M COMPANY

Submitted to

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Prepared by

**AScl Corporation/AScl-Duluth
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SEPTEMBER 1997

COD = 447,000 mg O₂ / kg chemical.

Dates of BOD test: 8/22/97 - 9/19/97.

Water bath temperature range during the test: 19.6 - 22.0°C (controller shorted out on 9/7/97 overnight, temperature out of range for about 16 hours.)

Lot number of Polyseed NX: D257.

TABLE 1. BOD Dilution Information for R1335

Sample ID (mg/L)	Stock Solution Concentration (mg/L)	Sample Volume (ml)	Sample Concentration (mg/L)
9	984	2.7	8.9
13	984	4.0	13.1
17	984	5.2	17.1
21	984	6.4	21.0

TABLE 2. BOD Blank Calculations for R1335

Sample ID	Day	FIRST REPLICATE			SECOND REPLICATE		
		Initial D.O.	Final D.O.	D.O. Drop	Initial D.O.	Final D.O.	D.O. Drop
Blank	5	8.94	8.79	0.15	8.96	8.78	0.18
Blank	10	8.94	8.60	0.34	8.96	8.42	0.54
Blank	20	8.94	8.61	0.33	8.96	8.54	0.42
Blank	28	8.94	8.64	0.30	8.96	8.18	0.78

TABLE 3. BOD Seed Correction Factor Calculations for R1335

Seed Conc. ml/Bottle	Day	FIRST REPLICATE				SECOND REPLICATE				Average SCF
		Initial D.O.	Final D.O.	D.O. Drop	SCF ^a	Initial D.O.	Final D.O.	D.O. Drop	SCF	
10	5	8.92	7.10	1.82	0.36	8.95	6.81	2.14	0.43	0.40
10	10	8.92	6.20	2.72	0.54	8.95	5.64	3.31	0.66	0.60
10	20	8.92	4.42	4.50	0.90	8.95	4.64	4.31	0.86	0.88
10	28	8.92	4.62	4.30	0.86	8.95	3.83	5.12	1.02	0.94

^a SCF = (D.O. drop * ml seed in test) / ml seed in seed blank.

TABLE 4. BOD Reference^a and Tox Blanks Calculations for R1335

Conc. mg/L	Day	SCF	FIRST REPLICATE					SECOND REPLICATE				
			Initial D.O.	Final D.O.	D.O. Drop	Corrected Drop	BOD mg/L ^b	Initial D.O.	Final D.O.	D.O. Drop	Corrected Drop	BOD mg/L
0	5	0.40	9.00	5.00	4.00	3.60	180	9.00	4.80	4.20	3.80	190
21.0	5	0.40	9.05	4.24	4.81	4.41	221	9.00	3.62	5.38	4.98	249

^a Reference = 150 mg glucose and 150 mg glutamic acid in 1 liter BOD dilution water, tested at 2% dilution.

^b BOD mg/L = (corrected D.O. drop) * 300 ml BOD volume / 6 ml reference.

TABLE 5. BOD Calculations for R1335

Conc. mg/L	Day	SCF	FIRST REPLICATE					SECOND REPLICATE				
			Initial D.O.	Final D.O.	D.O. Drop	Corrected Drop	BOD mg/kg ^a	Initial D.O.	Final D.O.	D.O. Drop	Corrected Drop	BOD mg/kg
8.9	5	0.40	9.00	8.11	0.89	0.49	—	9.03	7.84	1.19	0.79	—
13.1	5	0.40	9.01	8.04	0.97	0.57	—	9.03	7.92	1.11	0.71	—
17.1	5	0.40	8.97	7.30	1.67	1.27	—	8.99	7.61	1.38	0.98	—
21.0	5	0.40	9.00	7.42	1.58	1.18	<95,000	8.97	7.30	1.67	1.27	<95,000
			Mean <95,000					Mean <95,000				
8.9	10	0.60	9.00	7.34	1.66	1.06	—	9.03	7.28	1.75	1.15	—
13.1	10	0.60	9.01	7.16	1.85	1.25	—	9.03	7.04	1.99	1.39	—
17.1	10	0.60	8.97	6.61	2.36	1.76	—	8.99	6.94	2.05	1.45	—
21.0	10	0.60	9.00	4.21	4.79	4.19	199,500	8.97	3.65	5.32	4.72	224,800
			Mean 199,500					Mean 224,800				
8.9	20	0.88	9.00	5.30	3.70	2.82	316,900	9.03	5.51	3.52	2.64	296,600
13.1	20	0.88	9.01	4.62	4.39	3.51	267,900	9.03	4.31	4.72	3.84	293,100
17.1	20	0.88	8.97	2.96	6.01	5.13	300,000	8.99	4.14	4.85	3.97	232,200
21.0	20	0.88	9.00	<0.50	—	—	—	8.97	<0.50	—	—	—
			Mean 294,900					Mean 274,000				
8.9	28	0.94	9.00	5.18	3.82	2.88	232,600	9.03	5.80	3.23	2.29	257,300
13.1	28	0.94	9.01	4.34	4.67	3.73	284,700	9.03	4.41	4.62	3.68	280,900
17.1	28	0.94	8.97	2.66	6.31	5.37	314,000	8.99	2.80	6.19	5.25	307,000
21.0	28	0.94	9.00	2.10	6.90	5.96	283,800	8.97	1.42	7.55	6.61	314,800
			Mean 301,500					Mean 290,000				

^a BOD = corrected drop x 1,000,000 / test concentration.

Omitted data points: D.O. drop corrected for SCF too low (<2.0).
Final D.O. <0.50 mg/L.