

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-780. (1-Octanesulfonic acid) (CAS # 2795-39-3).

Remarks: The 3M production lot number was not available. The test sample is FC-780. Current information indicates it is a mixture of 0.5% PFOS, 14% diethylene glycol butyl ether, 76.95% water, 5.5% urea, 1.0% Sultone foamer, 1.15% sodium octyl sulfate, 0.8% polyoxyethylene monooctylphenyl ether, 0.05% sodium lauryl sulfate, and 0.05% tolyltriazole.

The following is an abbreviated summary of multiple biodegradation studies on FC-780. These studies apply to a mixture of the test with incompletely characterized concentrations of impurities. Data may not accurately reflect the biodegradability of the fluorochemical component of the test sample.

METHOD:

Method: Specific methods not noted.

Type: Aerobic BOD, Carbonaceous BOD, and Dichromate reflux COD

GLP: No

Year completed: 1982

Contact time: 20 days

Inoculum: Activated sludge mixed liquors from various sources.

RESULTS

Chemical Oxygen Demand (COD) range: 287,000 – 370,000 mg/kg

Biochemical Oxygen Demand (BOD) range:

5-Day: 24,000 – 190,000 mg/L

10-Day: 160,000 – 220,000 mg/L

20-Day: 210,000 – 250,000 mg/L

Carbonaceous-Biochemical Oxygen Demand (C-BOD) range:

5-Day: 20,000 – 170,000 mg/L

10-Day: 51,000 – 210,000 mg/L

20-Day: 220,000 – 250,000 mg/L

CONCLUSIONS

No reliable conclusions can be derived from these studies. The indication is that the majority of the product components are readily biodegradable.

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

DATA QUALITY

Reliability: Klimisch ranking = 3. The studies lack description and records of the method followed. The inoculum is not properly characterized. There is no characterization of the test substance purity, and the studies lack analytical confirmation of the amount of fluorochemical proportion in test solutions.

REFERENCES

Testing was conducted by multiple laboratories at the request of the 3M Company, Environmental Laboratory, St. Paul, MN, Lab Request numbers 7736, 7737, and 7738.

OTHER

Last changed: 6/26/00

06/23/2000

ENVIRONMENTAL LABORATORY
ARCHIVED FINAL REPORT

1

LAB REQUEST NO. 7736
REQUESTOR NAME: EAR
DEPARTMENT: 0535
PROJECT NO: 9960012600
DATE RECEIVED: 02/16/1982
DESC: FC-206 CCONTRACT LAB(S): PACE
EXP COMP DATE: 03/16/1982
DATE COMPLETED: 03/12/1982
PROJECT LEAD: JW STOCK
PHONE NO: 651-778-6438
3M FAX NO: 651-778-6176

SEE ALSO LRS 7625 7737 7738

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
1		FC203C	LOT501 L6519		
PACE	BOD-05	*BOD-05		500000	MG/KG WET
PACE	BOD-10	*BOD-10		620000	MG/KG WET
PACE	BOD-20	*BOD-20		800000	MG/KG WET
PACE	COD-RFX	*COD (DICHROMATE REFLUX)		810000	MG/KG WET
2		FC206C	LOT502 L6518		
PACE	BOD-05	*BOD-05		250000	MG/KG WET
PACE	BOD-10	*BOD-10		300000	MG/KG WET
PACE	BOD-20	*BOD-20		350000	MG/KG WET
PACE	COD-RFX	*COD (DICHROMATE REFLUX)		450000	MG/KG WET
3		FC-780	LOT 501		
PACE	BOD-05	*BOD-05		190000	MG/KG WET
PACE	BOD-10	*BOD-10		210000	MG/KG WET
PACE	BOD-20	*BOD-20		250000	MG/KG WET
PACE	COD-RFX	*COD (DICHROMATE REFLUX)		350000	MG/KG WET
4		FC203C	#1 INHIBITED		
PACE	BOD-05	*BOD-05		470000	MG/KG WET
PACE	BOD-10	*BOD-10		580000	MG/KG WET
PACE	BOD-20	*BOD-20		730000	MG/KG WET
5		FC206C	#2 INHIBITED		
PACE	BOD-05	*BOD-05		240000	MG/KG WET
PACE	BOD-10	*BOD-10		300000	MG/KG WET
PACE	BOD-20	*BOD-20		370000	MG/KG WET
6		FC-780	#3 INHIBITED		
PACE	BOD-05	*BOD-05		170000	MG/KG WET
PACE	BOD-10	*BOD-10		210000	MG/KG WET
PACE	BOD-20	*BOD-20		250000	MG/KG WET

* = CONTRACT LAB DATA

06/23/2000

ENVIRONMENTAL LABORATORY
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LAB REQUEST NO. 7737
REQUESTOR NAME: EAR
DEPARTMENT: 0535
PROJECT NO: 9960012600
DATE RECEIVED: 02/16/1982
DESC: FC-206-C AND FC-203C MIL SPEC TESTING

CONTRACT LAB(S): SERCO
EXP COMP DATE: 04/06/1982
DATE COMPLETED: 04/01/1982
PROJECT LEAD: JW STOCK
PHONE NO: 651-778-6438
3M FAX NO: 651-778-6176

SEE ALSO LRS 7625 7736 7738

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
1		FC203C	LOT501 L6519		
SERCO BOD-05		*BOD-05		130000 MG/L	
SERCO BOD-10		*BOD-10		370000 MG/L	
SERCO BOD-20		*BOD-20		440000 MG/L	
SERCO COD-RFX		*COD (DICHROMATE REFLUX)		737000 MG/L	
2		FC206C	LOT502 L6518		
SERCO BOD-05		*BOD-05		71000 MG/L	
SERCO BOD-10		*BOD-10		190000 MG/L	
SERCO BOD-20		*BOD-20		240000 MG/L	
SERCO COD-RFX		*COD (DICHROMATE REFLUX)		370000 MG/L	
3		FC-780	LOT 501		
SERCO BOD-05		*BOD-05		48000 MG/L	
SERCO BOD-10		*BOD-10		160000 MG/L	
SERCO BOD-20		*BOD-20		210000 MG/L	
SERCO COD-RFX		*COD (DICHROMATE REFLUX)		287000 MG/L	
4		FC203C	#1 INHIBITED		
SERCO BOD-05		*BOD-05		58000 MG/L	
SERCO BOD-10		*BOD-10		140000 MG/L	
SERCO BOD-20		*BOD-20		440000 MG/L	
5		FC206C	#2 INHIBITED		
SERCO BOD-05		*BOD-05		28000 MG/L	
SERCO BOD-10		*BOD-10		65000 MG/L	
SERCO BOD-20		*BOD-20		260000 MG/L	
6		FC-780	#3 INHIBITED		
SERCO BOD-05		*BOD-05		21000 MG/L	
SERCO BOD-10		*BOD-10		51000 MG/L	
SERCO BOD-20		*BOD-20		220000 MG/L	

* = CONTRACT LAB DATA



1931 West County Road C2
Roseville, Minnesota 55113 (612) 636-7173

LABORATORY ANALYSIS REPORT NO: 263
03/18/82

PAGE 1

3M Company
Bldg. 2-3E-09 P.O. Box 33331
St. Paul MN 55133
Mr. Keith Hoffmann
Lab Coordinator

DATE COLLECTED:
DATE RECEIVED: 02/16/82
COLLECTED BY: CLIENT
PICKED UP BY: CLIENT
SAMPLE TYPE: PRODUCT SAMPLE

SERCO SAMPLE NO:
SAMPLE DESCRIPTION:

749 750 751

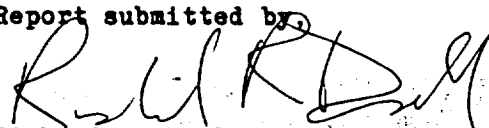
FL 203C 206C 780B
7737-1 7737-2 7737-3

ANALYSIS:

BOD, 5-day, mg/L	130000	71000	48000
BOD, 10-day, mg/L	370000	190000	160000
BOD, 20-day, mg/L	.59 440000	.64 240000	73 210000
BOD, carbonaceous, mg/L	58000	28000	21000
BOD, 10-day carbonaceous, mg/L	140000	65000	51000
BOD, 20-day carbonaceous, mg/L	.59 440000	.7 260000	.72 220000
COD, Chemical Oxygen Demand, mg/L	737000	370000	287000

All analyses were performed using EPA or other recognized methodologies.

Report submitted by:


Richard R. Dahl
Project Manager

< means "not detected at this level"

SANITARY ENGINEERING LABORATORIES, INC.



06/23/2000

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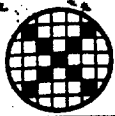
LAB REQUEST NO. 7738
REQUESTOR NAME: EAR
DEPARTMENT: 0535
PROJECT NO: 9960012600
DATE RECEIVED: 02/23/1982
DESC: FC-206C AND FC 203C MIL SPEC TESTING

CONTRACT LAB(S): CAPS
EXP COMP DATE: 04/16/1982
DATE COMPLETED: 04/23/1982
PROJECT LEAD: JW STOCK
PHONE NO: 651-778-6438
3M FAX NO: 651-778-6176

SEE ALSO LRS 7625 7736 7737

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
1		FC203C	LOT501 L6519		
CAPS	BOD-05	*BOD-05		140000	MG/KG
CAPS	BOD-10	*BOD-10		540000	MG/KG
CAPS	BOD-20	*BOD-20		570000	MG/KG
CAPS	COD-RFX	*COD (DICHROMATE REFLUX)		720000	MG/KG
2		FC206C	LOT502 L6518		
CAPS	BOD-05	*BOD-05		36000	MG/KG
CAPS	BOD-10	*BOD-10		260000	MG/KG
CAPS	BOD-20	*BOD-20		260000	MG/KG
CAPS	COD-RFX	*COD (DICHROMATE REFLUX)		410000	MG/KG
3		FC-780	LOT501		
CAPS	BOD-05	*BOD-05		24000	MG/KG
CAPS	BOD-10	*BOD-10		220000	MG/KG
CAPS	BOD-20	*BOD-20		240000	MG/KG
CAPS	COD-RFX	*COD (DICHROMATE REFLUX)		360000	MG/KG
4		FC203C	#1 INHIBITED		
CAPS	BOD-05	*BOD-05		63000	MG/KG
CAPS	BOD-10	*BOD-10		480000	MG/KG
CAPS	BOD-20	*BOD-20		620000	MG/KG
5		FC206C	#2 INHIBITED		
CAPS	BOD-05	*BOD-05		32000	MG/KG
CAPS	BOD-10	*BOD-10		260000	MG/KG
CAPS	BOD-20	*BOD-20		320000	MG/KG
6		FC-780	#3 INHIBITED		
CAPS	BOD-05	*BOD-05		20000	MG/KG
CAPS	BOD-10	*BOD-10		210000	MG/KG
CAPS	BOD-20	*BOD-20		230000	MG/KG

* = CONTRACT LAB DATA



CAPSULE LABORATORIES

ADVANCED TECHNOLOGY DIVISION

A Division of Economics Laboratory, Inc.
605 West County Road E, St. Paul, MN 55112, (612) 482-8855

FILE WITH LR 773

April 29, 1982

Mr. Dave Seeley
3M Environmental Lab
935 Bush Ave.
Bldg. 2-3E
St. Paul, MN 55144

Dear Dave,

Enclosed please find the results for COD on your sample # 7738-1. The test was rerun per your request. This time the test was performed using a larger amount of sample. The previous test may have been biased due to the large dilution factor.

If you have any other questions or problems, please call.

Sincerely,

CAPSULE LABORATORIES

Betsy A. Hannum

Betsy A. Hannum
Senior Chemist *PaL*

BAH:jjd



TECHNICAL DATA

April 29, 1982

Samples submitted for testing by SM Environmental Lab on April 26, 1982.

<u>Sample Description</u>	<u>Capsule Log #</u>	<u>COD</u>
7738-1 (Old Capsule Log # 12193)	13322	720,000 mg/kg



TECHNICAL DATA

April 16, 1982

Samples Submitted by: Minnesota Mining & Manufacturing Company

Samples Received on: February 24, 1982

	Capsule Log #	12193	12194	12195
		203C	206C	780B
	Sample Description:	7738-1	7738-2	7738-3
		we get 740,000 + 730,000 Series sat 737,000 us Navy sat 714,000	3m sat 260,000 320,000 Pac sat 450,000 Series sat 370,000 Navy sat 349,000	ck
COD		950,000 mg/kg	410,000 mg/kg	360,000 mg/kg
5 Day BOD Uninhibited		140,000 mg/kg	36,000 mg/kg	24,000 mg/kg
5 Day BOD Inhibited		63,000 mg/kg	32,000 mg/kg	20,000 mg/kg
10 Day BOD Uninhibited		540,000 mg/kg	260,000 mg/kg	220,000 mg/kg
10 Day BOD Inhibited		480,000 mg/kg	260,000 mg/kg	210,000 mg/kg
	Navy 517,000 Series 446,000 3m 580,000	570,000 mg/kg	260,000 mg/kg	240,000 mg/kg
20 Day BOD Uninhibited		620,000 mg/kg	320,000 mg/kg	230,000 mg/kg
20 Day BOD Inhibited		290,000 3m 600,000 Series 440,000 Pac 370,000	290,000 260,000 370,000	230,000 220,000 250,000