

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

LAB REQUEST NO. 7736
REQUESTOR NAME: EAR
DEPARTMENT: 0535
PROJECT NO: 9960012600
DATE RECEIVED: 02/16/1982
DESC: FC-206 C

CONTRACT 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

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

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

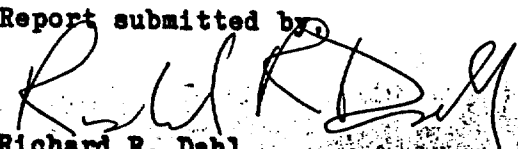
DATE COLLECTED:
DATE RECEIVED: 02/16/82
COLLECTED BY: CLIENT
PICKED UP BY: CLIENT
SAMPLE TYPE: PRODUCT SAMPLE

SERCO SAMPLE NO:
SAMPLE DESCRIPTION:

	749	750	751
	FL 253C	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

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< means "not detected at this level"

SANITARY ENGINEERING LABORATORIES, INC.

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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

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Mr. Dave Seel~~ey~~
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 # 773B-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

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002492



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

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TECHNICAL DATA

April 16, 1982

Samples Submitted by: Minnesota Mining & Manufacturing Company

Samples Received on: February 24, 1982

	Capsule Log #	12193 203C	12194 206C	12195 780B
	Sample Description:	7738-1	7738-2	7738-3
		we get 740,000 + 730,000 Series got 737,000 us Navy got 744,000	3m got 360,000 PAC got 450,000 Series got 370,000 Navy got 344,000	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	Navy 232,000 PAC 330,000 Series 240,000 3m 276,000	Navy 237,000 Series 320,000 + 210,000 PAC 256,000 3m 280,000, 240,000
20 Day BOD Uninhibited		570,000 mg/kg	260,000 mg/kg	240,000 mg/kg
20 Day BOD Inhibited		620,000 mg/kg	320,000 mg/kg	230,000 mg/kg
		Navy 600,000 Series 440,000 PAC	290,000 260,000 370,000	230,000 220,000 250,000

002494